AVIATION WEEK

APRIL 11, 1949

A McGRAW-HILL PUBLICATION

at Berlin and Frankfurt

L-M–BARTOW
high intensity runway lighting helps speed "Vittles"

The U. S. Air Force, with its long and favorable experience with "Bartows" in the Aleutians, Newfoundland, and other tough flying areas, has installed these high intensity lights on Berlin Air Lift terminals to assure maximum number of landings in this all-important "Vittles" operation. A Tempelhof passover means no landing; under the precisely scheduled operation there's no time for a second pass, and the ship returns to its base still loaded.

In addition to scores of air force and navy bases, many commercial airports and airlines enjoy the benefits of greatly reduced cancellations and passovers, and greatly increased safety provided by L-M—Bartow lighting.

Here are some of the commercial airports that have or are installing the latest type "Bartows" which have the controllable beam that makes possible the very high intensity of 180,000 beam candlepower—without glare!

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For more information about engineered lighting for large or small airports, **phone or write Airport Lighting Division, Line Material Co., East Stroudsburg, Pennsylvania.**

7117

Illustration shows what the pilot sees as he approaches a typical L-M—Bartow-equipped runway.

LM

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Westinghouse was selected to do the job.

The finished product, which more than meets these stiff requirements, is illustrated above. Here are some of its advanced features.

1. **Newly developed flame arrester that makes the assembly explosion-proof.**
2. **Twenty-four volt, specially-designed, d-c motor.**
3. **Speed limiter for close regulation of up and down speed.**
4. **Triple planetary gears for speed reduction.**

In addition, the unit contains a torque-limiting clutch and a magnetic brake for holding the load in case of power failure. Also separate construction of brake and speed-limiting device permits accurate "inching" of the hoist for handling critical loads.

Weighing only 92 lbs., it is capable of lifting 4,300 lbs. at the rate of 24 feet per minute. Its unusually long life eliminates the necessity of carrying a spare so that both weight and space are saved.

A Westinghouse Engineer will be glad to give you further information or work with you on other aircraft problems.

J-21517

Westinghouse

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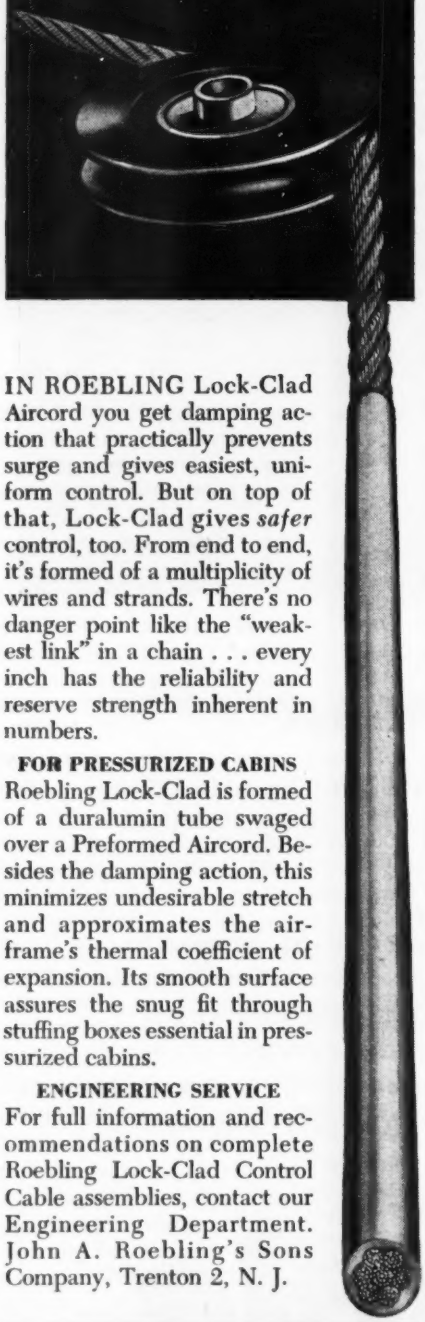

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ROEBLING

A CENTURY OF CONFIDENCE

Vol. 50, No. 15

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TEXACO Lubricants and Fuels
FOR THE AVIATION INDUSTRY

Tune in . . . TEXACO STAR THEATRE every Wednesday night starring Milton Berle. See newspaper for time and station.

The Pentagon Picture

The first two weeks of Louis Johnson's regime as Secretary of National Defense have shown a marked change in Pentagon atmosphere.

In place of rule by committees and boards that marked the Forrestal administration is the influence of a strong personality with positive ideas on how to run what is probably the most administratively complex and most important job in the Truman cabinet. It is already evident that Louis Johnson intends to run the National Military Establishment for as long as he holds his present job.

Pattern of the Johnson regime is not yet clear but there are already some interesting straws in the wind. Not the least interesting is emergence of Gen. Joseph T. McNarney as one of Johnson's most powerful military advisers. McNarney, an Air Force veteran with a long reputation as an able military administrator, has been given the job of reorganizing the sprawling and cumbersome inter-service groups that have grown into a meaningless mass during the postwar years. Nine of these groups have already been abolished. McNarney may become the permanent chairman of the Joint Chiefs of Staff, a position in which he would wield enormous influence over the entire defense organization. This would pose some interesting problems for the present administration in the Air Force. For McNarney has been eased out of the Pentagon group which has taken postwar control of the Air Force and is now directing its destinies.

McNarney Position

McNarney belongs to an older military generation than the present youthful USAF leaders and has been in sharp disagreement with their policy on more than one occasion. It will be interesting to see what the McNarney-directed reorganization does to the USAF and its top personnel. If McNarney continues in his present capacity it is not unlikely that Gen. George C. Kenny, brilliant air strategist, may return from his semi-exile at the Air University to one of the new top jobs in the expanding military picture.

Johnson has made no secret of his opinions that air power is the first line of American defense and rates top priority in the National Military Establishment. In this policy he will find himself more in tune with the public, press and Congress than was his predecessor. Johnson has been an active politician for a long time and is politically ambitious.

Political Ambitions

He is already being mentioned as a possibility for the Democratic nomination for the presidency in 1952 if President Truman sticks to his decision not to run again. Against this background Johnson will be striving to turn in an outstanding job in his present capacity without stirring any bitter animosities.

This will be a difficult task. For the two big jobs that must be done before the National Military Establishment can operate efficiently are to clean away administrative cobwebs that have been accumulating in all three services for generations and to knock together the heads of a few of the most outspoken firebrands in the competition between the Air Force and Naval Aviation. Doing both those jobs with dispatch will create bitter enemies as well as greater efficiency.

Administration Maze

Extent to which administrative procedures have become more tangled instead of simplified since unification is illustrated by what now happens to military aircraft procurement funds. Formerly they were cleared by the Navy and the War Department. Now they go from USAF and Navy to the Secretary of Defense; then to the Research and Development Board; the Munitions Board; the Bureau of the Budget and the White House. If they survive this administrative maze and gauntlet of civil servants, aircraft manufacturers may eventually get a letter of intent for some business. In some cases still another step—the Joint Weapons Evaluation Board—is added to the maze.

The inter-service rows that embarrass the military administrators when they flare in public prints are not in themselves unhealthy. In most cases it is the methods the services use to combat each other in the press rather than the basic arguments that are odious. There is real danger that in attempting to curb some of these methods, the healthy rivalry and technical competition so necessary to military progress may be stifled.

There are disturbing signs that an attempt may be made to throttle controversy by establishing a rigid censorship of military information that would rival wartime restrictions. One of the new additions to the top Pentagon public relations hierarchy is a specialist on wartime censorship.

Censorship Plan

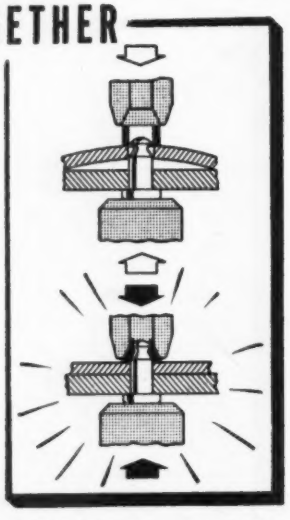
The new Pentagon public relations policy has not yet emerged from the fog of administrative reorganization but there are some revealing glimpses of what may come. One group is known to favor pulling down a supposedly press-proof curtain on all information relating to procurement, technical developments, the state of the National Military Establishment, etc. This would be done with a goal of achieving a complete security blackout within two years.

Such a blackout might make the Russians work a bit harder to fill in their compendiums on our military strength. On the other hand, observers who have studied the Canadian spy cases wonder how much extra effort would be required for their spies to overcome a public relations blackout. Meanwhile, such a blackout would prevent the American taxpayer from getting anything more than a Pentagon handout on what was being done with the billions contributed for defense.

Recent history of military appropriations has indicated that groups which do not have widespread public support do not fare well on Capitol Hill when they come hat-in-hand looking for money.

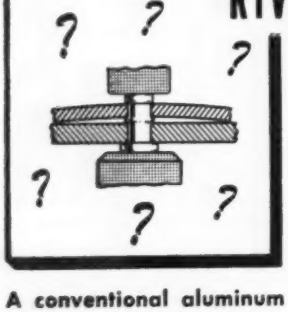
Smashing victories of the Air Force in its legislative battles during the past two years are ample proof that grass roots public support pays off when appropriation time rolls around. Perhaps one of the measures of the Johnson regime at the Pentagon will be the manner in which it balances security against the need for honest information on what is happening to public money and how much defense it is really buying.

Hi-shears DRAW THE WORK TOGETHER



HI-SHEAR collar opposes the rivet head. Acts as own draw set, automatically draws work together — instantly — firmly.

Conventional RIVETS



A conventional aluminum rivet "flashes" unless riveter draws work together in a skillfully executed progressive operation. A "flashed" rivet requires careful removal — danger of serious spoilage.

Naturally, we don't recommend extreme pre-loading, a condition that should be detected by inspection in accordance with safe standards prior to riveting. But, a fastener's ability to draw the work tightly together is an important quality because it produces a better connection, saves fitting up and riveting time and reduces work spoilage.

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AVIATION CALENDAR

Apr. 11-13—Society of Automotive Engineers national aeronautic and air transport meeting, Hotel New Yorker, New York.

Apr. 11-16—Western Metal Congress and Exposition, sponsored by American Society for Metals, Shrine Civic Auditorium, Los Angeles, Calif.

Apr. 13—Crop dusting conference, Harrisburg State Airport, New Cumberland, Pa.

Apr. 19-20—Fifth annual meeting of the Magnesium Assn., Edgewater Beach Hotel, Chicago.

Apr. 19-21—AIEE southwest district meeting, Baker Hotel, Dallas, Tex.

Apr. 21-22—National Agricultural Aviation Conference, Municipal Auditorium, Kansas City, Mo.

Apr. 24-27—American Assn. of Airport Executives convention, Oklahoma City.

Apr. 26—Annual meeting, American Ordnance Assn., Ambassador Hotel, Los Angeles, Calif.

Apr. 29-30—Sixth IAS personal aircraft meeting Hotel Allis, Wichita.

Apr. 30-May 1—Fourth annual southeastern air show and exposition, Craig Field, Jackson, Fla.

May 2-4—Second annual meeting of the Airport Operators Council, Denver.

May 3-20—Third annual foreign transportation institute, American University, Washington, D. C.

May 5-6—Purdue University School of Aeronautics air transportation conference, Lafayette, Ind.

May 8—Annual southern states air carnival, Dannelly Field, Montgomery, Ala.

May 10—IATA traffic conferences, Europe.

May 12-13—1949 forum, American Helicopter Society, Hotel New Yorker, New York City.

May 17—IATA technical conference, Switzerland.

May 18—National Fire Protection Assn. committee on aviation and airport fire protection, Fairmont Hotel, San Francisco.

May 19-21—Society for Experimental Stress Analysis, spring meeting, Hotel Statler, Detroit, Mich.

May 21—Aviation progress exposition, Baltimore Municipal Airport, Baltimore, Md.

May 23-26—Eighth national conference, Society of Aeronautical Weight Engineers, Inc., Biltmore Hotel, Dayton.

May 24-27—Second joint conference of IAS, Royal Aeronautical Society, Hotel Astor, New York City.

May 26—IATA executive committee, Montreal.

May 31-June 4—AWA annual convention, Statler Hotel, Wash., D. C.

June 3-12—Sixth annual Michigan Aviation week.

June 4-5—All-Woman Air Show, Amelia Earheart Field, Miami, Fla.

June 4-5—Fourth annual air fair and industrial exposition, Shawnee, Okla.

June 7—Third ICAO assembly, Montreal.

June 20-24—AIEE, summer general meeting, New Ocean House, Swampscott, Mass.

June 26-27—NAA 27th annual national convention, Akron, Ohio.

June 27-29—Formal dedication of Naval Ordnance Laboratory aeroballistics division, followed by five half-day technical sessions, White Oak, Silver Spring 19, Md.

PICTURE CREDITS

12—Harold G. Martin; 14—Convair; 16—Wide World; 18, 20—Bureau of Standards; 45, 47—McGraw-Hill World News.

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To: Executive aircraft operators
Private plane owners
Fleet operators

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High-nickel alloys, and chromium-nickel stainless steels, resist destructive effects of high temperatures in the Westinghouse "Yankee" engines that power the "Banshee" and "Phantom" jet fighters shown here. These twin-jets were built by McDonnell Aircraft Corporation, St. Louis 3, Mo. for the U. S. Navy. The turbo-jets are products of Westinghouse Electric Corp., Aviation Gas Turbine Division, South Philadelphia, Pa.

Hot Planes

...IN MORE WAYS THAN ONE!

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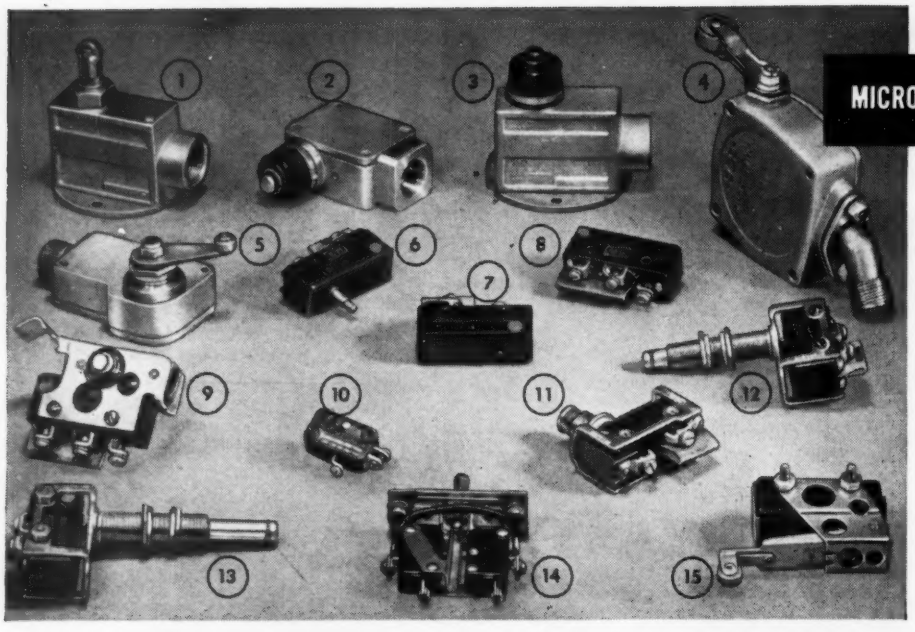

MICRO...first name in precision switches

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1 Light weight, rugged, aluminum-housed switch (MICRO BZV-7RQ9T1) with roller plunger actuator. Designed to conform to **AN3218-2.**

2 Sealed plunger housing (MICRO 2VB1) for enclosing one or two MICRO V3-1 switches. V3-1 conforms to **AN3234-1.**

3 Light weight, rugged, aluminum-housed switch with sealed plunger (MICRO BZV-7RNT1). Designed to conform to **AN3217-2.**

4 Aluminum housing with roller arm actuator (MICRO LMR1). Conforms to **AN3233-1.** Designed to enclose basic switch (MICRO BZ-R31) which conforms to **AN3210-1.**

5 Aluminum housing with rotary actuator (MICRO 1VA1) for enclosing MICRO V3-1 switch. V3-1 conforms to **AN3234-1.**

6 "S" plunger basic switch (MICRO BZ-7RST). Conforms to **AN3215-1.**

7 Pin plunger basic switch (MICRO BZ-R31). Conforms to **AN3210-1.**

8 Pin plunger, split contact basic switch (MICRO BZ-3YT). Conforms to **AN3216-1.**

9 Lever arm actuator bracket (MICRO 9-10762RH). Conforms to **AN3170-1.** Designed for use with basic switch (MICRO BZ-R31) which conforms to **AN3210-1.**

10 Small, high capacity switch (MICRO V3-1). Conforms to **AN3234-1.**

11 Actuator bracket (MICRO MB2731A). Conforms to **AN3166-1.** Designed for use with basic switch (MICRO BZ-R31) which conforms to **AN3210-1.**

12 Actuator bracket (MICRO MC2711B). Designed to conform to **AN3168-1.** For use with basic switch (MICRO BZ-R31) which conforms to **AN3210-1.**

13 Actuator bracket (MICRO MC7711). Conforms to **AN3167-1.** For use with basic switch (MICRO BZ-R31) which conforms to **AN3210-1.**

14 Momentary action toggle switch (MICRO 1AT1). Designed to conform to **AN3235-1.** Contains two MICRO V3-1 switches which conform to **AN3234-1.**

15 Roller lever actuator bracket (MICRO AD5721R). Conforms to **AN3169-1.** For use with basic switch (MICRO BZ-R31) which conforms to **AN3210-1.**

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NEWS DIGEST

DOMESTIC

Capital Airlines disclosed plans to ask Civil Aeronautics Board for a transcontinental skycoach route from New York and Washington to Los Angeles and San Francisco via Pittsburgh, Cleveland, Detroit, Chicago, Omaha, Denver and Salt Lake City.

Arthur E. Smith, 37, was named chief engineer of Pratt & Whitney Aircraft division of United Aircraft Corp., succeeding the late Andrew V. D. Willgoos. Smith, assistant chief engineer since 1944, joined P&W in 1935 as a test engineer. He became project engineer of the R-2800 engine in 1940 and later was chief engineer of the wartime Kansas City, Mo., plant.

W. R. Grace & Co. sold 70,000 shares of Eastern Air Lines common stock, presumably due to its acquisition of 174,000 shares of National Airlines, and EAL competitor, for which it must have CAB approval.

Civil Aeronautics Administration in cooperation with the Air Line Pilots Assn., is conducting a survey to determine what steps can be taken to remedy deficiencies in cockpit visibility of transport aircraft.

Vice Adm. Arthur V. Radford was appointed to succeed Adm. DeWitt C. Ramsey as Commander of the Pacific Fleet. Radford, who became a full Admiral in new post, is a Naval aviator and commanded carrier task force groups in World War II.

FINANCIAL

Piasecki Helicopter Corp. reports net income before taxes of $98,461 for year ended Dec. 31, 1948, on sales of $2,977,986. Working capital at year-end was $319,506, and backlog was $4,017,460.

Sperry Corp. reports profit of $8,770,523 for 1948 on sales of $120,859,852. Unfilled orders and letters of intent at the end of February, 1948, totaled about $162 million.

Solar Aircraft Co. reports net income of $861,382 for nine months ended Jan. 31, 1949, on sales of $12,416,055.

INDUSTRY OBSERVER

► Glenn L. Martin Co. is trying to interest the Air Force in a turboprop version of its XB-48 turbojet bomber. Second XB-48, powered by six GE-Allison J-35 turbojets, was recently delivered to USAF. Martin's new version of the XB-48 would be powered by four turboprop engines with dual contra-rotating propellers.

► Douglas Aircraft Co. is now building an X-3 supersonic research plane at its Santa Monica plant. Contract originally was a design study but final design has now been determined and construction of the plane is now under way. Other Douglas experimental projects include: prototype of a new Navy attack bomber; a supersonic Navy fighter; and design studies for a transonic multi-jet bomber for Navy carrier duty.

► Chemists of the Glenn L. Martin Co. have developed a new flame-resistant compound for coating interiors of aircraft. Compound can be readily applied to fabrics and will withstand numerous launderings and dry cleanings without any reduction in flame-resistance qualities.

► Air Force is facing serious deficiencies in maintenance stands for large aircraft. Ground handling equipment for the Convair B-36 is practically non-existent. When B-36 groups move away from the Convair Ft. Worth plant at Carswell AFB, the ground equipment problem will become acute. Due to bomber's size, not even standard USAF towing tractors can be used on the B-36. Military Air Transport Service is also acutely in need of adequate field maintenance stands for its largest transports (Boeing C-97 and Douglas C-74).

► MATS has radically revised its maintenance procedures as a result of operational experience gained on the Berlin airlift which indicates that engines and tires require the most frequent replacements.

► Guidance is still the big problem in the guided missile field. Several aircraft companies have developed missiles capable of operations over a 500 mi. range but so far no satisfactory method has been devised for guiding the missile into a profitable target at the end of its journey. Meanwhile considerable progress has been made in stabilization and rough directional guidance of missiles.

► Canadian government has appropriated $350,000 for an aerodynamic research laboratory, including a supersonic wind tunnel, at the University of Toronto.

► Australian navy has placed another order for Fairey Firefly carrier-based reconnaissance planes with Fairey Aviation Ltd. of England. Assembly of the Fireflys will be done at the newly established Fairey plant in New South Wales. Fairey has sold the same type to the Canadians, Dutch, and British navy.

► U. S. Air Force pilots have flown the Douglas AD-3 Skyraider in simulated combat against the North American F-51. The fighter was naturally faster but observers were surprised by the ease with which the Skyraider outmaneuvered its opponent with the aid of its large dive flaps. USAF is considering the Skyraider as a low level attack plane to fill a current gap in its operational stable.

► All-Weather Flying Center of USAF at Wilmington, Ohio, has developed an automatic glide path flare-out device for use in completely automatic landings of large aircraft. Straight glide path now used on standard ILS equipment results in extremely hard landings. The automatic flare-out consists of an extremely sensitive altimeter inside the aircraft which transfers automatic control from the glide path to the altimeter as the plane approaches the runway threshold. The sensitive altimeter is hooked into the auto-pilot to flare-out the rate of descent until it reaches zero just at the instant of landing.

► Canadair Ltd. of Montreal is thinking about designing a feeder liner for use in northern Canada and other areas of the sterling bloc where surface transportation is poor. Canadair current projects include manufacture of 100 F-86A jet fighters for the RCAF under license from North American Aviation, Inc., and production of Canadair Four transports.

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AVIATION WEEK

April 11, 1949

Vinson Asks Increase in 1950 Plane Funds

Urges $778 million over defense budget to buy 1220 more Air Force and Navy planes.

By Robert Hotz

A boost in military aircraft procurement funds for fiscal 1950 by $778 million to buy an additional 1220 planes was strongly urged by Rep. Carl A. Vinson (D., Ga.), powerful chairman of the House Armed Services Committee.

Vinson's proposals were made during a bitter denunciation on the House floor of the $15 billion defense budget ceiling imposed by President Truman on recommendation of the Budget Bureau.

▶ **Procurement Record**—To the aircraft industry, Vinson's plan would mean an increase in military aircraft procurement funds for fiscal 1950 to $2.9 billion, about $200 million more than the post-war record total of $2.7 billion voted by the 80th Congress for fiscal 1949. The $2.9 billion would buy 3731 planes compared with 3670 planes contracted for under the fiscal 1949 budget.

Proposed boost in aircraft procurement funds was part of Vinson's overall plan recommending a $1.5 billion increase in the defense budget to partially restore a $2.5 billion slash by the Budget Bureau in the final version of the defense budget prepared by the Joint Chiefs of Staff. The $1.6 billion increase roughly would be split: U. S. Air Force, $800 million; Navy $545 million; and Army $254 million.

Highlights of aviation proposals:

▶ **Air Force**—Procurement budget of $1,915,000,000 to buy 2370 planes in fiscal 1950. This compares with $2,045,000,000 and 2437 planes for fiscal 1949. Group strength would be at 57 combat groups plus 19 separate squadrons. This compares with the Truman budget mark of 48 groups plus 10 squadrons and the USAF strength on Jan. 1, 1949 of 59 combat groups plus one provision group on the Berlin airlift and 19 separate squadrons.

The additional $800 million (now earmarked for Universal Military Training) urged by Vinson would be split as follows:

- **Procurement**—435 million to buy 702 additional planes. Vinson said if the entire $800 million were used for procurement it would purchase 1116 additional planes. Some air power advocates on Capitol Hill favor using the entire $800 million for procurement since planes ordered now will not require personnel or maintenance funds until 1951 and the modernization of USAF equipment would be accelerated at the rate originally planned under the 70-Group program.
- **Operations and Maintenance**—$235 million.
- **Personnel**—$94 million to boost USAF

TWO VERSIONS OF GRUMMAN GUARDIAN

First flight picture of the dual role planned for the Grumman Guardian is shown above. XTB3F-1 (top) is a special search plane designed for anti-Schnorkel submarine operations. The large radome bulging below the belly houses a special search radar for the detection of Schnorkel submarine breathing devices. It was first used during the later stages of the last war on a Grumman TBF torpedo plane nicknamed the "Guppy" because of its bulging belly. XTB3F-2 was designed as an carrier-based attack plane. Both experimental models are powered with a Pratt & Whitney R-2800-46 engine. Production models to be known as the AF-1s and AF-2s will be powered by the R-2800-48 piston engine. Navy has ordered 23 of the AF series.

strength from 413,000 in the Truman budget to 450,000 for the 57 group level.

• **Research**—$36 million.

Vinson attacked the lack of uniform air power policy in the Truman budget, pointing out that the USAF cutback toward the 48 groups specified by the President has already wasted considerable of the USAF funds appropriated last year and has delayed the target date for a 70-Group modernized USAF until 1954, regardless of what remedial action Congress takes this spring when the military appropriation bills come up for approval.

▶ **Navy**—Aircraft procurement budget of $1,030,000,000 to buy 1361 new planes is recommended. This is an increase of $343 million and 518 planes over the Truman budget. It compares with $753 million and 1233 planes for fiscal 1949. Under the Truman budget for fiscal 1950 the Navy would be authorized to buy only 843 new planes at a cost of $657 million. Vinson pointed out that his recommendations are still well short of the $1.3 billion procurement program required by the Navy to provide the 1700 new planes needed for a full-strength Naval Air service.

Increase in Naval personnel from 411,000 approved by the President to 555,000, and a $98 million boost in operation and maintenance funds were recommended by Vinson to put two more carriers with their air groups; 30 destroyers; and additional patrol vessels into active service. A $17 million increase in Naval research was urged to restore a Budget Bureau cut that knocked out projects for prototype development of one piloted aircraft type (probably a twin engine carrier-based anti-submarine plane); a new guided missile; as well as new electronic equipment, powerplants and armament for aircraft.

Vinson said the President's budget would mean a reduction in Naval Air strength of 418 planes, three carriers and nine Naval Air fields. Naval plane strength would drop from the 8183 planes now in service to 7765.

▶ **Army**—An $84 million boost to buy an additional 350 skysweeper anti-aircraft guns for use against low level attack aircraft; personnel increase to 711,000, including more airborne infantry requiring transport aircraft; and $48 million for modernization of an additional 493 tanks were urged by Vinson.

Vinson's program will probably appear in the recommendations of the House Armed Services Committee or may be offered as an amendment from the floor. In whatever manner it is presented it is sure to stir a bitter fight from Truman administration supporters who are pledged to hold the $15 billion defense ceiling as well as the economy-minded group among the Republicans.

Vinson charged that the Joint Chiefs of Staff were a better authority for determining the defense needs of the United States than the Budget Bureau.

Vinson also revealed for the first time the precise details of the long-drawn battle over the defense budget fought during last fall and winter. According to Vinson the chronology was: August 1948 the Joint Chiefs drew up a $30 billion budget; by September the McNarney board had cut it to $23.5 billion; by November it had been cut again to $17.5 billion; and in December the Budget Bureau made the final cut to $15 billion.

More B-36s

U. S. Air Force cancelled its procurement plans for 44 Boeing B-54 bombers to buy another 36 Convair B-36 intercontinental bombers and five more Boeing Stratojet (B-47) bombers. About $150 million in fiscal 1949 procurement funds were involved in the shift.

The new Convair order brings the total of B-36s delivered and on order to 170 not including the prototype XB-36. Convair has completed nearly 60 of this number and is rolling completed bombers from its Ft. Worth plant at an average of one per week.

▶ **Jet Models**—All of the new B-36s will be equipped with the jet engine pod nacelles housing four General Electric J-47 turbojet engines in addition to the standard power from six Pratt & Whitney Wasp Major 3500 hp. piston engines. Total cost of the additional 36 B-36s is estimated at $100 million, of which a little more than half will be added to the current Convair backlog of $190 million, the balance going for government furnished equipment.

USAF will increase the strength of its heavy bomber and strategic reconnaissance groups from 18 to 30 planes each as a result of the additional B-36 orders. Two bomber groups of B-36s now in operation, the 7th and 11th at Carswell AFB, Tex., will be complemented by two additional B-36 bomber groups and two B-36 strategic reconnaissance groups to be formed.

▶ **Stratojets**—Additional five Stratojets brings the announced total on order to 15. Boeing's Wichita plant is already tooling up for a high volume production line and subcontracting for the bomber has been on such a scale as to indicate a considerable increase in the B-47 production program when fiscal 1950 funds become available.

The USAF procurement shifts were approved by the Joint Chiefs of Staff, Secretary of Defense and the Budget Bureau. They mean that USAF has virtually standardized on the B-36 as its only entry in the long range heavy bombardment field while the B-47 is to become standard in the light bomber category. The Boeing B-54 was an improved version of the B-50 series powered by a Pratt & Whitney VDT engine. The B-54 was generally considered to be the final development of the basic Boeing bomber series that began with the B-29.

Gen. Powers Retires

Maj. Gen. E. M. (Pop) Powers, USAF assistant deputy chief of air staff, has retired from active duty and is expected to take a top aircraft industry post soon. Brig. Gen. Donald L. Putt, who has been director of research and development for headquarters, USAF, succeeds Gen. Powers as assistant deputy chief of air staff, and as member of the National Advisory Committee for Aeronautics.

Executive Salaries Revealed In Survey

Aircraft industry executives who earned over $25,000 during 1948 are listed in a partial survey by AVIATION WEEK. Companies not covered in the current survey will appear later.

Salary details:

▶ **Douglas Aircraft Co.**—Donald Douglas, president, $96,500 (in addition, $13,021 was paid by the company toward his pension fund); F. W. Conant, vice president, $43,400 (plus a $2750 pension fund payment); Frederick Hines, counsel, $43,944 (plus a $534 pension fund payment); Ralph Hunt, vice president, $38,416; Arthur Raymond, vice president, $43,400. Company's total outlay for directors' and officers' salaries and fees: $329,320 (plus pension fund payments totaling $29,829).

▶ **Glenn L. Martin Co.**—Glenn Martin, president, $60,460 (plus a $15,568 pension fund payment); Harry Rowland, executive vice president, $40,449 (plus a $7250 pension fund payment); George Wiley, vice president, $30,440 (plus a $4754 pension fund payment);

Morgan Schemerhorn, vice president, $25,440 (plus a $3260 pension fund payment). Total outlay for directors' and officers' salaries and fees: $261,494 (plus $32,550 in pension fund payments). This exceeded the 1947 outlay by $25,520, due primarily to the hiring of a vice president for sales in 1948—C. Hart Miller at a salary of $17,708.

▶ **Grumman Aircraft Engineering Corp.**—L. R. Grumman, chairman of the board, $50,350 (plus $9832 for retirement benefits); L. A. Swirbul, president, $60,350 (plus a $10,295 retirement benefit payments); William Schwendler, executive vice president, $40,350 (plus $5821 retirement payment); E. Clinton Towl, vice president, $27,350 (plus $3667 retirement payment). Total outlay for directors' and officers' salaries and fees: $211,688 (plus $34,352 in payments for retirement benefits).

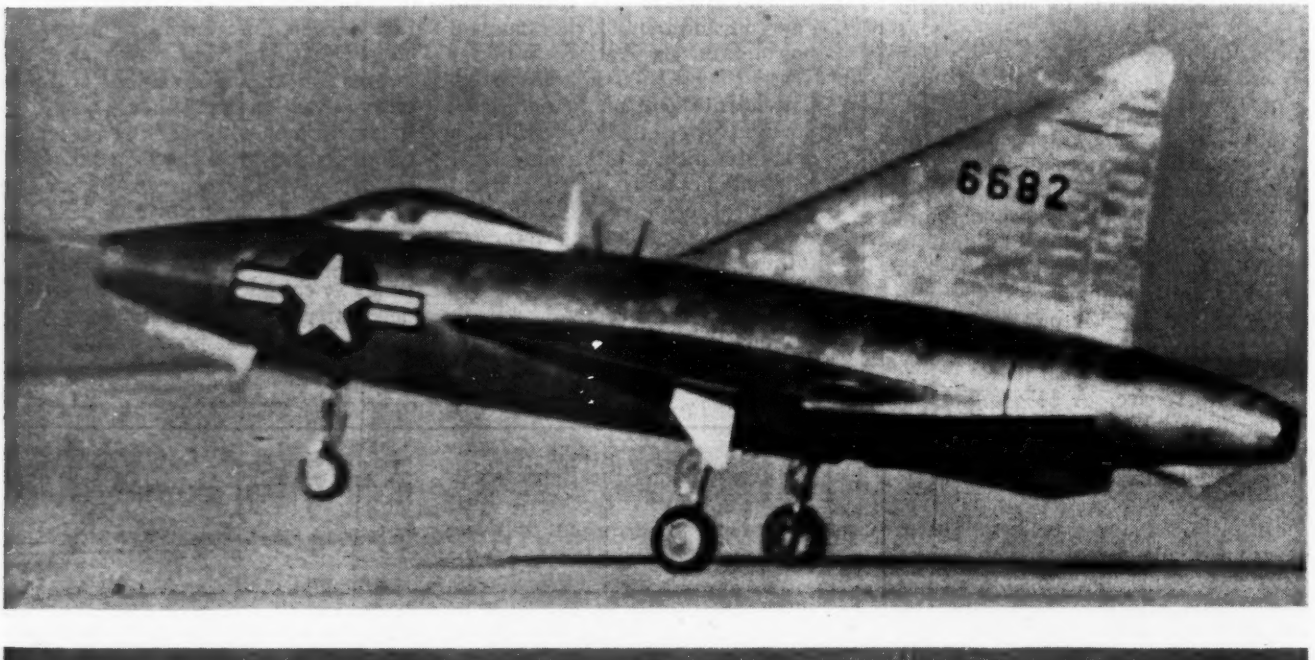
▶ **Piper Aircraft Corp.**—William C. Shriver, director, $18,238, plus $12,000 in bonuses and/or shares in profits.

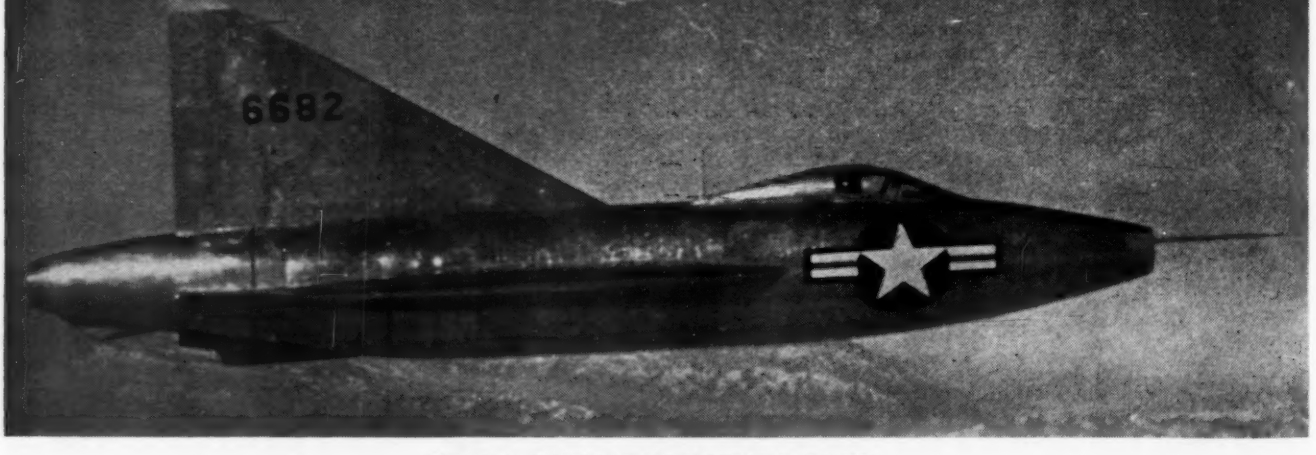
▶ **Ryan Aeronautical Co.**—T. Claude Ryan, $26,041 aggregate remuneration. Earnings of two vice presidents below the $25,000 level were also reported: Earl Prudden, $15,625; G. C. Woodard, $18,375.

▶ **Timken Roller Bearing Co.**—William E. Umstattd, $155,320 (plus $12,769 in retirement fund payment); H. H. Timken, chairman of the board, $50,875, (plus $2522 in retirement payment); R. C. Brower, secretary-treasurer, $43,171 (plus $3799 in retirement payments); A. M. Donze, vice president, $38,375 (plus $3221 in retirement payment); J. E. Fick, vice president, $38,375 (plus $2720 in retirement payment); L. M. Klinedinst, sales consultant, $60,461 (plus $4430 in retirement payment); W. R. Timken, vice president, $50,875 (plus $2142 in retirement fund payment).

▶ **Square D Co.**—F. W. Magin, president, $55,000, plus $72,147 in bonuses and/or shares in profits (plus $17,826 in pension fund payment); Lauron Mercer, vice president, $20,000, plus $20,645 in bonuses and/or shares in profits (plus $5742 pension fund payment); Henry Morgan, secretary-treasurer, $20,000, plus $21,590 in bonuses and/or shares in profits (plus $6987 pension fund payment); Joseph Pengilly, vice president, $20,000, plus $11,000 in bonuses and/or shares in profits (plus $6270 pension fund payment); Victor Carbonara, vice president, $19,895, plus $20,000 in bonuses and/or shares in profits (plus $4786 pension fund payment).

▶ **Aero Supply Manufacturing Co.**—Director and officer earnings aggregated $56,966, with no individual earning over $25,000, company reported.





DELTA WING PROTOTYPE FLIES

First flight photos of Convair's Delta-Wing Model 7002 research plane taken at Muroc AFB. These photos, blown up from 16mm movie film, show the extremely high angle of attack necessary on takeoff and the tapered stainless-steel tube of the afterburner on the Allison J-33 jet engine. Initial flight tests indicated some difficulties in roll control which have been alleviated through adjustments of the elevons used instead of elevators and ailerons on the Convair Delta-Wing design.

Aircraft Shipments Decline in January

Shipments by 33 aircraft companies in January totaled 2,225,000 airframe pounds, Bureau of the Census and Civil Aeronautics Administration report. For the first time since July of 1948, the reports includes airframe weight of military aircraft delivered.

Under current method of reporting, airframe weight is the only indication of overall business as military shipments are not reported by unit or value. January airframe weight took a considerable drop from the December weight, 3,865,400 lb. Both military and civilian shipments dropped. Military airframe weight for the two months was: December, 3,276,600 lb.; January, 1,944,300 lb. Civilian airframe weight: December, 588,800 lb.; January, 280,700 lb.

▶ **Civil Shipments**—Total of 160 civilian aircraft, valued with parts and other products at $7,413,139, was shipped in January, compared to 235, valued with parts and other products at $11,814,724, delivered in January. Civil shipments in January included nine transport aircraft and 151 personal-type planes.

January backlog of transport planes was 156, down five from the preceding month. This is the lowest transport plane backlog manufacturers have shown, the figures declining steadily from 339 reported in January, 1948.

▶ **Engines**—Military engine shipments by total horsepower increased slightly in January over December, 2,536,300 hp. against 2,439,000 hp. This brought an overall gain in horsepower from 2,565,100 hp. in December to 2,648,900 hp. in January, despite a drop in the horsepower of civilian engines—from 125,800 hp. in December to 112,600 hp. in January.

Civil engines shipped in January numbered 266 (310 in December), valued with parts and other products at $3,235,297, compared to value of shipments of $3,429,824 in December.

Eastern's Earnings Tops in Industry

Eastern Air Lines continued to show the best earnings record among the major air carriers with the release of its 1948 annual report.

The company reported net profits of $2,346,871 or 98 cents a share for 1948, compared with a 1947 net profit of $1,259,196 or 53 cents a share.

Eastern's accomplishment was without benefit of any need mail pay increase. EAL, along with American, had the distinction of receiving a compensatory service rate, devoid of subsidy, during 1948.

▶ **Depreciation Policy**—The reported 1948 Eastern earnings are after depreciation charges of $6,604,562, compared with $5,626,612 for 1947. The management continues the policy of using a four-year depreciation base for its Constellation equipment, compared with the seven-year period followed by Civil Aeronautics Board in its mail rate determinations.

The ultra-conservative accounting followed by the company in its reports to stockholders is revealed in the provision for Federal income taxes. Instead of the normal 38 percent tax in effect, the management provided for 56 percent. This is a clue that earnings for tax purposes were actually much higher than reported to stockholders.

Another manifestation of the company's real earning power is found in the sharp improvement in its net working capital. As of Dec. 31, 1948, this balance aggregated $16,565,284, compared with only $7,135,131 a year earlier.

▶ **Credit Terms**—The Eastern management also took advantage of its favorable banking credit accommodations by drawing down the full amount permissible under the terms, $16 million at an interest rate of only 1¾ percent. This loan presumably is to provide the company with an added margin of safety. Virtually offsetting this bank credit are short-term and marketable securities which very likely cover the interest charges on the bank loan. This bank loan is to be repaid in twelve equal quarterly installments.

Committee Cuts CAA Budget

House Appropriations Committee slashed $20,134,895 from the record-high $218,008,500 budget recommended for Civil Aeronautics Administration for the coming fiscal year by the Budget Bureau, leaving the administration cash and contract authorization totalling $197,873,605.

With the observation that CAA costs "should be borne, in part at least, by the airlines", the committee reduced CAA's total cash allocation by $11,934,895 (from the $151,008,500 proposed by Budget Bureau to $139,073,605) and its total contract authorization by $8,200,000 (from the Budget Bureau's proposed $67,000,000 to $58,800,000).

▶ **Trim CAB**—The committee also trimmed Civil Aeronautics Board's coming year appropriation by $359,500—from the $3,980,000 recommended by Budget Bureau to $3,620,500. Denying the Board 50 new personnel, the committee suggested that the answer to CAB's backlog lies in improved administration instead of in "continually increasing appropriations".

Following are details on funds allowed CAA by the House committee:

• **Salaries and expenses,** $94,402,105. This is $3,034,895 below the $97,437,000 proposed by the Budget Bureau, but $11,951,105 over CAA's current year appropriation. The allocation includes $10,389,199 for operation of 151 existing air traffic control towers, 17 that will soon be commissioned, and 12 new control towers that are yet to be established.

• **Air navigation facilities,** $36,950,000—$18,650,000 cash and $18,300,000 contract authorization. This is a reduction of $13,200,000 in Budget Bureau's recommendation of $50,150,000 ($23,650,000 cash and $26,500,000 contract authorization), but a substantial increase over CAA's current year allocation of $22,440,499 ($10,099,000 cash and $12,341,499 contract authorization).

• **Air navigation development,** $7,000,000—$3,000,000 cash and $4,000,000 contract authorization. This is a reduction of $3,000,000 in Budget Bureau's recommended $10,000,000 ($6,000,000 cash and $4,000,000 contract authorization), and compared with the nominal $100,000 allocated for the current year. The committee explained that testimony submitted after Budget Bureau's recommendation had been drawn showed that $7,000,000 would be sufficient to inaugurate the long-range all-weather-flying program over the next year.

• **Technical development,** $1,450,000—a reduction of $350,000 in the $1,800,000 recommended by Budget Bureau and allowed CAA for the current year. The committee commented that "some of the work now being done under this program is of doubtful value".

• **Airport construction,** $51,000,000—$14,500,000 cash and $36,500,000 contract authorization. Budget Bureau recommended $15,000,000 cash and $36,500,000 contract authorization. The $500,000 clipped was for administration. Almost all—$11,500,000—of CAA's cash allocation is for the liquidation of contracts. CAA's current year airport allocation is $3,000,000 cash and $37,000,000 contract authorization. In addition, the committee allowed $5,800,000 for international airports at Fairbanks and Anchorage in Alaska—the amount requested by Budget Bureau.

• **Washington National Airport,** $1,271,500, a reduction of $50,000 in the $1,321,500 proposed by Budget Bureau. Of the total, $1,250,000 is for operation and $21,500 for finishing construction work started this year.

How runway looks from air at night. Box-like area in background is approach zone.

Los Angeles Airport FIDO Shown

New fog-dispelling system demonstrated for first time, although operational use is still several weeks away.

LOS ANGELES—Oil flames from 392 triple burners encircled a runway and approach zone at Los Angeles Municipal Airport, as the first public demonstration of the new thermal fog dispersal system, commercial development of wartime FIDO, was set off by electric switch.

The $842,000 heater system warms the air over the runway three degrees, thus increasing its ability to absorb the water vapor which is fog. The result is to produce ceiling heights despite fog of 400 ft. to 300 ft. in the approach zone; 250 ft. in the touchdown zone on the runway, and ranging down from 200 to 75 ft. on the rest of the runway.

Five major airlines using the airport, American, TWA, United, Western, and Pan American, have underwritten the $386,541 advanced by the Los Angeles Department of Airports to go with a federal airport grant of $455,459. The airlines have agreed to pay the city's share in five years and pay operation and maintenance costs of the system.

It will not be put into regular operation for several weeks until CAA and Weather Bureau personnel are trained to operate it.

The system burns No. 2 diesel oil, the cheapest available. It can burn off enough fog for a plane landing at cost of $75 to $80, depending on fog density. For a 50-passenger plane this would be a cost of about $1.50 a passenger. Airlines expect it to payoff in savings of cost of transportation of passengers from landings at more remote alternate airports, and in overtime on airline personnel due to fog conditions.

Solid fences to shut off glare of the flames from motorists have been erected at selected intervals along the lines of the burners.

Burners and under ground fuel system have been developed by Todd Shipyards Corp. Combustion Equipment division. The three-jet burners atomize the oil under 1000 lb./psi. and it is ignited by electric units. Heat is controlled by varying back pressure on fuel oil return lines which increases or decreases discharge capacity of the nozzles. Control makes possible flames from three to 15 ft. in height.

The line of burners extends 6000 ft. along both sides of the main east-west runway including a 2000 ft. approach zone at the east end.

High intensity runway lights (100,000 candlepower) with five stages of brilliancy, and a slope line lighting system, together with radar and ILS, are expected by Los Angeles officials to make the airport the "best equipped all-weather airport in the world."

Participating in the first public demonstration were Harold Jones, CAB member and former Los Angeles attorney; Clarence Young Los Angeles airports department manager and former CAB member; Joe Marriett, sixth region CAA administrator, Mayor Fletcher Bowron of Los Angeles; Robert L. Smith, airport commission president, and other officials.

Esenwein Named

August C. Esenwein, former vice president and general manager of Aviation Maintenance Corp., Van Nuys, Calif., has been named executive vice president of Piper Aircraft Corp., Lock Haven, Pa.

Fairchild Produces New Jet Engine

Fairchild Engine & Airplane Corp.'s Ranger division has begun deliveries to the Navy of production models of the J-44, an "expendable" turbojet power unit, the company's annual report discloses. Production order was received in January, 1948, for the engine, and negotiations are in progress for an additional quantity.

While the Ranger division was starting to fulfill its first postwar production contract, the Aircraft division at Hagerstown completed its production contract on the Packet with the delivery of the 219th and last plane. Deliveries of the first of 135 C-119s are scheduled to begin this spring.

► **Lower Sales**—Because of the completion in September of the Packet project, Fairchild's 1948 income of $30,850,075 fell more than $7 million below 1947 income of $38,304,514. Profit also was lower, $1,552,382 in 1948 against $1,642,412 in 1947. It was Fairchild's tenth consecutive profitable year.

Working capital at the close of 1948 was off about $1 million from the preceding year. But part of this is reflected in the withdrawal from current assets of $2,158,992 for plant acquisition and expansion. This is roughly one-half of what the company proposes to spend in 1949 for this purpose.

► **Employment Up**—Employment and backlog rose during the year. Employes numbered 6003 at the end of 1948, compared to 5081 on Dec. 31, 1947. Backlog nearly doubled from $43,700,000 to $84,200,000. Military production orders constitute 87 percent of the backlog (this is before the $8 million order for 100 T-31 trainers), the largest share for C-119s. Military experimental and development work is about 13 percent. The C-82 Packet accounted for about 55 percent of 1948 sales.

Other Fairchild activities as reflected in the report:

• **Aircraft division** has an order for eight C-119-type planes for the Marines, in addition to the Air Force version. Marine planes are designated R4Q-1. Division also is working on the XC-120 Pack Plane prototype, and on track-tread landing gear.

• **Ranger division** is developing three different types of power plants, one each for Bureau of Aeronautics, Bureau of Ordnance and Bureau of Ships. Subcontracts totaling about $5 million have been received from General Electric for J-47 engine components.

• **Pilotless Plane division** is in production on the Lark guided missile for the Air Force and has an order from the Navy for an experimental test quantity. A "new and distinctive guidance system," designated "Skylark," has been

developed by the division with the Naval Research Laboratory serving as consultant.

• **Personal Planes division** cleaned out its F-24 inventory during 1948. Last month the postwar Fairchild design, F-47 received a Civil Aeronautics Administration Approved Type Certificate, but the project has been shelved. Fairchild estimates it would cost $2 million to achieve satisfactory production.

New Transactions Reported by SEC

Purchase of 900 shares of Piper preferred stock by William T. Piper, president and chairman of the board of the company, was disclosed by the Securities and Exchange Commission. This gives him holdings of 9160 shares of Piper's 146,705 shares of preferred stock, and 166,276 shares of the company's 843,064 shares of common stock.

Other aviation transactions reported by SEC for the mid-February to mid-March period:

▶ **Pan American Airways Corp.**—Harold Bixby, director, New York City, purchase of 629 shares, making a total holding of 5000 shares; J. Clawson Roop, officer, New York City, sale of 300 shares, leaving a holding of 1042 shares; John S. Woodbridge, officer, Wilmington, Del., sale of 164 shares, leaving a total holding of 1000 shares.

▶ **United Air Lines**—Martin C. Ansorge, director, New York City, purchase of 200 shares, making a total holding of 750 shares and 100 preferred shares; Justin W. Dart, director, Los Angeles, purchase of 2000 common shares and 200 preferred, making a total holding of 12,006 common shares, and 700 preferred shares.

▶ **Cessna Aircraft Co.**—Will Price, director, Wichita, purchase of 300 shares, making a total holding of 820 shares.

▶ **Consolidated Vultee Aircraft Corp.**—Leland W. Miller, officer, San Diego, purchase of 100 shares, his total holding.

▶ **Eastern Air Lines**—John W. Moore, director, New York City, purchase of 200 shares, making a total holding of 500; S. Peabody, director, Chicago, purchase of 100 shares, making a total holding of 500.

▶ **Western Air Lines**—William Coulter, director and main stockholder, Los Angeles, sale of 2300 shares, leaving a holding of 213,197 shares.

SEC also reported the stock holdings of new company officers and directors, as follows: John D. Biggers, director, Bendix Aviation Corp., none; T. Roland Berner, director, Curtiss Wright Corp., 13,400; Oliver P. Echols, director, Northrop Aircraft, none; Hugh W. Darling, director, Western Air Lines, 1300 shares.

PAA Settles Strike

To settle a 24-hour strike of 258 radio operators which interrupted its Atlantic and Pacific operations, Pan American Airways has given the radiomen a severance pay increase to $3000, and a wage increase to $610 per month.

In return, PAA hopes it has knocked out what it believes—but the union denies—was the start of a "featherbedding" trend in airline operations.

The old contract provided top pay of $580 per month and $1200 severance pay. The radiomen, members of the Transport Workers Union of America, demanded the high severance pay to offset their fears of eventual unemployment due to the airline's announced intention of equipping all its planes with pilot-operated radio telephones. The union originally had asked for a $90 per month pay boost.

PAA promises in the new contract to try to place displaced radiomen in jobs comparable in pay and responsibility wherever possible. Those accepting alternate jobs will lose 20 percent of their severance rights yearly.

TWU has disclosed that it still intends to continue its fight for a law which will prevent use of radio telephone on over-water routes. It claims radio telegraphy is a quicker and surer means of communication at sea (AVIATION WEEK, Mar. 28).

Pan Am officials have retorted that radio telephone is actually more efficient, is favored by the pilots, and has been used successfully for 18 years by domestic airlines.

They characterize TWU's move to limit use of radio-telephone as "an attempt at featherbedding for a very small group of men. Not withstanding the fact that voice radio does not require a flight radio officer, these men seek to remain as flight radio operators in Pan American's employ."

TWU asserts, however, that although it will try to stop use of radio-telephones on over-water routes, it has never suggested that radio operators be employed for planes which use radio-telephones.

NEW AIA HEAD

Admiral DeWitt Clinton Ramsey, now commander of all U. S. Forces in the Pacific, will take over as president of the Aircraft Industries Assn. July 1. He is scheduled to retire from the Navy May 1. Admiral Ramsey will succeed Maj. Gen. Oliver P. Echols who left AIA to become chairman of the board of Northrop Aviation, Inc.

TEMCO Sales Up

Texas Engineering & Manufacturing Co., Dallas, moved several rungs up the financial ladder in 1948, reporting net earnings of $871,252 for the year, on sales of $10,088,951.

Sales volume increased 71 percent over 1947 sales, and percentage of net profit in ratio to sales was increased from 6.3 percent to 8.6 percent. Earnings for the year 1948 were equivalent to $7.78 a share of common stock outstanding, compared to earnings of $3.31 per share in 1947. Dividend of 75 cents a share was paid on outstanding no par common stock in 1948.

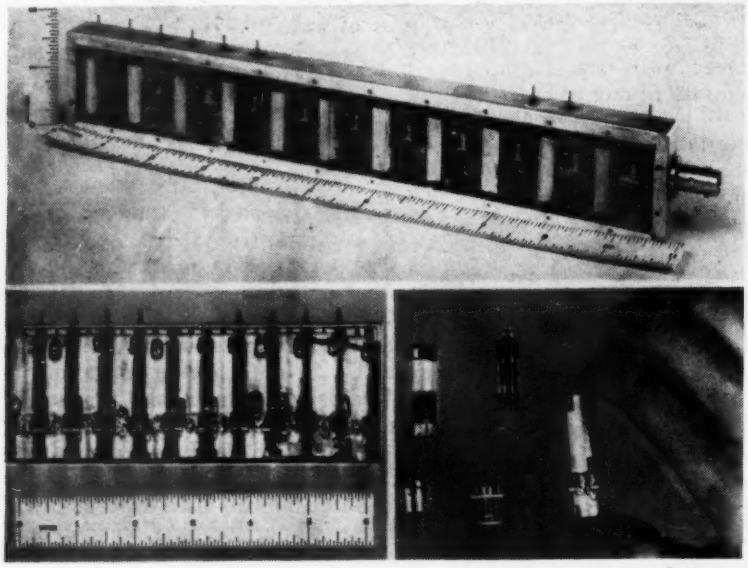
Contracts for overhaul, modification and conversion of military aircraft for the U. S. and foreign governments bulked large in total sales. These included a large percentage of overhauls on C-54s used in the Berlin airlift. Other business included continued production of the two-place Swift all-metal personal plane, and development of a basic trainer, whose low initial and operating cost is expected to make it a good selling item to foreign countries with limited budgets for government aircraft.

President Robert McCulloch and executive vice president and treasurer H. L. Howard point out that plant facilities of the company are leased from the Naval industrial reserve (major portion of Plant A, former North American Aviation plant at Grand Prairie, Tex.) with a lease expiring Dec. 31, 1952. Prospects for continued occupancy after that date, based on present indications of future business, are good. Company may reduce facilities leased within 120 days, if desired. New contracts since the first of the year include orders from the Colombian government for reworking aircraft, and from Boeing for bomber components.

Airport Purchase

University of California has announced purchase of the University Airport at Davis, Calif., with adjoining Straloch Farms, to provide facilities for experimental flights including testing and improvement of agricultural aircraft. The field was recently awarded the Haire Airport Trophy as an outstanding Class I airport.

The University college of agriculture and agricultural experimental station has already sponsored demonstration flights at the airport by fixed wing planes and helicopters in agricultural uses. The airport will also be used for experiments in air shipping of perishable farm products, in cooperation with the Air Cargo Institute of California.



Unit, left top, is one model of 60 mc. wideband high-gain intermediate frequency amplifier built at National Bureau of Standards for Navy Bureau of Aeronautics. It uses subminiature tubes and compact assemblies of miniature parts. Similar i-f amplifier, left bottom, uses printed electronic assemblies throughout. Adjacent are shown parts for single printed amplifier stage together with completed stage assembly. Photo, right, depicts typical pilot line set up to evaluate production line problems.

Subminiatures Call For New Skills

High consumption of very small electronic equipment in expendable missiles calls for efficient mass production.

Not content with "miniaturization" of electronic equipment for airborne installations, engineers are now utilizing "subminiaturization" of this material to reduce its size and weight.

But reduction of size and weight alone is not enough for tactical purposes. Since both research and tactical missiles are expendable, it is essential that subminiature electronic equipment have a high producibility.

The small size of this equipment, as seen in the accompanying illustrations, renders difficult the problem of mass production. It is to facilitate the soldering, mounting and forming of these tiny components on a production basis that a new program has been initiated at the National Bureau of Standards by the Navy Bureau of Aeronautics.

▶**Heat Problem**—An electronic assembly is considered subminiature when its volume is compacted to a dimensional limit primarily imposed by the smallest available electron tube. By taking the dimensions of this tube as the maximum, Bureau of Standards engineers design wiring and assembly that falls within even these tiny limits.

Basic approach to this problem is to package the entire assembly in a single unit, rather than individual components, so that each assembly comprises a sealed plug-in unit.

This compactness presents a major problem. Although the size of the unit is reduced to extremely small dimensions, the electrical load carried remains the same. This means that the heat to be dissipated per unit area is increased enormously. A solution to this difficulty is the "potting" of the entire pre-wired bundle into NBS casting resin, developed during the war.

▶**Material Data**—Since materials which are stable at high temperatures are required for miniature components and assemblies, few of the commonly available insulating materials may be used. Some of the high-temperature insulating materials satisfactory for miniature assemblies are ceramics, vitreous enamels and silicone-bonded bodies.

Low dielectric-constant ceramics, such as steatite, are used in preference to organic insulation material. High dielectric-constant titanate ceramics can serve not only as satisfactory printed-circuit base materials but also as miniature capacitor dielectrics. Ceramic dielectrics have been used throughout because of the potential scarcity of mica in times of national emergency.

Fashioning the high dielectric-constant ceramic bodies into cylinders makes them stronger than they would be in flat shapes. These cylinders are made to play a multiple role as capacitors, tube shields, stand-off insulators and base materials for printed wiring.

Because of the high heat encountered in subminiature electronic devices, high-temperature wire is required in conjunction with special soldering or welding techniques.

▶**Amplifier Ramifications**—The intermediate-frequency amplifier chosen for miniaturization embodies a type of critical circuit layout which represents the most typical problems. The miniaturized amplifier was designed to have eight stagger-tuned i-f stages, a detector, a video amplifier and a cathode-follower output circuit; more than 95 decibels gain from the i-f input to output of the detector; manual and automatic gain control; a 60-mc. center frequency and

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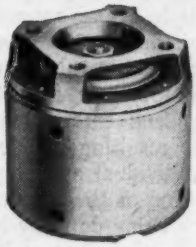

1¼" bottom-filling valve* as used on Republic F-84 Thunderjet.

¾" top-filling valve with mounting flange as used on McDonnell F-2H Banshee.

This new PARKER valve controls fuel tank levels far more accurately. Has balanced pilot valve which operates independently of flow rates or pressures. Actuated by internal float. Offered in both top-filling and bottom-filling models.

Compact—Light weight—¾-1" size weighs ⅝ lb.
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Suitable for high pressure systems—0 to 50 psi.,
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Special tubular capacitors, left, for use at high operating temperatures found in miniature assemblies are made by coating high-K titanate ceramic tubing with silver-pigmented paint. Individual lengths are heat-dried under infrared lamps before firing at 1300 F. Inverted rotary press, right, prints electronic circuits directly on cylindrical surfaces. About 90 percent of circuitry for each stage of i-f amplifier is established on ceramic cylinder which slips over subminiature electron tube.

a bandwidth of 10 mc.; and an assembly readily adaptable to mass production.

Two methods of fabrication were employed for the miniaturized i-f amplifiers. One unit (assembly A) was developed using a maximum of miniature component parts based on standard design. A second assembly (assembly B) used a maximum of printed circuits.

▶**Design of One Type**—Assembly A was designed so that it could be readily manufactured with techniques similar to those currently employed in the electronic industry. The circuit for this amplifier is conventional and all stages are laid out in a straight line on a metal plate 1$\frac{1}{8}$ in. wide with the interstage coupling networks located between adjacent parallel tubes.

The steatite inductor forms are wound with high-temperature insulated wire and have adjustable powdered-iron cores which may be tuned by a screwdriver. To dispense with separate brackets, the resistors are mounted directly in the inductor forms. End plates of these forms are metallized with the required pattern to interconnect the resistors and circuit elements when soldered into place.

Bifilar-wound inductors are used for interstage coupling networks to eliminate coupling capacitors with their associated high capacities to ground. The amplifier contains 38 tubular, high dielectric-constant, ceramic by-pass capacitors, most of which are located under the bases of the vacuum tubes in ordinarily unused space.

Most of the metal parts are light-gage stampings, inexpensive to make. Principal insulating material is steatite.

▶**Production Facilitated**—The amplifier design provides for the addition of prefabricated subassemblies to the main assembly at various points in the production line. Wiremen are therefore not required to handle individual components but only larger subassemblies.

Few wires other than resistor and tube leads are used to connect components of this amplifier, remainder of the interconnections being supplied by printed circuitry. The size of the amplifier exclusive of the shield can is 1$\frac{1}{8}$ by 10$\frac{1}{8}$ by $\frac{5}{8}$ in., although no attempt was made to achieve the absolute minimum size. Instead, compromises were made to facilitate production of an extremely rugged amplifier.

▶**Second Type**—Assembly B, the printed-circuit assembly, was made to the same general specifications as Assembly A, which uses standard miniature components. Assembly B is packaged in a hermetically-sealed container approximately $\frac{5}{8} \times 2 \times 6\frac{3}{8}$ in. long.

Basic design is characterized by an individual stage or subassembly type of construction, employing changes in the printed circuitry where necessary to alter the function of the stage. This subassembly type of construction requires only four soldered connections between stages.

Typical stage is an assembly of four major parts; three printed ceramic parts and a vacuum tube. This design is based upon the use of a high dielectric-constant ceramic cylinder which slips over the subminiature vacuum tube.

On the surface of the cylinder is printed a major portion of all the capacitors, resistors and associated circuitry. A bifilar-wound ceramic inductor form is attached to the subminiature tube base and to the bottom of the ceramic cylinder surrounding the vacuum tube. A fourth element, a short ceramic cylinder of high dielectric-constant, fits over the inductor form.

In the process of making electrical connection to the vacuum tube, all four parts are soldered simultaneously in an interlocking assembly.

Inside of the large ceramic tube is metallized, serving both as a ground plane for the multiple by-pass capacitors and as a shield for the vacuum tube.

Exterior of the ceramic tube is covered with high-temperature insulation on which a metallized exterior shield coating is applied, resulting in a completely shielded individual assembly.

▶**Printing Data**—One of the important phases of the work being done by NBS for BuAer is the development of high-temperature printed resistors. Since the high-temperature resistor problem will not be solved by a single achievement, this program is a continuing one.

Simple high-capacity printing equipment for establishing circuitry on the special cylindrical ceramic parts has been designed and constructed. Conductive decalcomanias have been developed as an alternate method of applying the required multiple circuit elements. This technique is useful in simple hand operations as well as in more elaborate methods; for example, a slightly modified bottle-labeling machine may be used.

Other production jigs and techniques to facilitate production of the i-f amplifier have been developed for greater mechanization of printed circuit processing.

Experience gained in this development program points the way toward even smaller and lighter printed and miniature component assemblies.

New Tunnel Combines Speed, Altitude Tests

What is reportedly the world's first wind tunnel designed to develop supersonic speeds under conditions found at 50 to 80 mi. above the earth has been put into operation at the University of California.

The new test facility, made possible chiefly because of long strides taken in vacuum and jet pump development during the war, will permit study of fluid mechanics at supersonic speeds in a realm beyond reach of present tunnels.

Built with funds supplied by the Office of Naval Research, development of the project was begun in 1946 under the direction of Dr. R. G. Folsom, professor of mechanical engineering at U.C.L.A., and E. D. Kane, research engineer.

Kane points out that, although there are a number of tunnels in operation which generate faster-than-sound airstreams, these will solve only those problems of supersonic flight relatively near sea-level.

It also has been difficult to analyze data obtained from instruments sent into the upper atmosphere by rockets, because effects of such altitudes on the instruments themselves can't be accurately estimated.

The new tunnel, estimated to be capable of creating speeds four times the velocity of sound in pressures 100,000 times less than atmospheric, should eliminate many of the difficulties encountered.

Extreme low pressures are created in tunnel by a steam jet vacuum pump system consisting of five stages of pumps requiring 3,500,000 Btu./hr. to operate. Pumps are almost as large as the working section of the tunnel, each of the first two stages being about 15 ft. long.

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Units are hermetically sealed . . . weigh only 2 ounces each. Repeatable.

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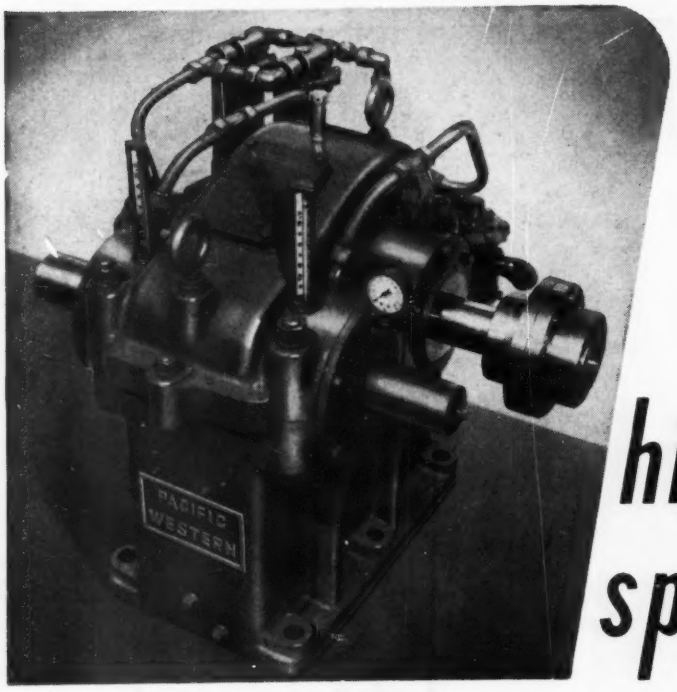

This typical Pacific-Western high-speed unit is fully enclosed, and has integral lubrication and cooling systems. This type of unit is available in a complete range of ratios and capacities.

high speed ON THE GROUND

The terrific rotational speeds that must be attained in modern aircraft-development laboratories, for the engineering and testing of modern aviation mechanical needs, are easily provided by Pacific-Western high-speed units.

Special features were designed into a Pacific-Western gear box to test a new type of axial-flow compressor. In this application, input is 350 hp at 3600 rpm; output speed is 24,000 rpm. Pitchline velocity is 12,000 fpm, journal velocity is 11,000 fpm. Actually, this Pacific-Western unit is capable of speeds up to 36,000 rpm — 3½ miles per minute pitchline velocity. That's *fast* for any gear box operating up to 8 hours at a time.

More than fifty years of experience, and the finest gearmaking facilities in the West, are ready to serve you at our 3 plants. In the aircraft field, our experience encompasses virtually every mechanical power-transmission problem in aviation—in the air and on the ground. Our technicians are continually at work to extend known practices for the solution of unprecedented problems.

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GEAR PRODUCTS

Main tunnel section is 25 ft. in length and ranges up to 8 ft. in height. It has a test chamber about 5 ft. in diameter and 7 ft. long with a nozzle (test section) 4 in. in diameter. Additional development is expected to bring the nozzle up to 8 in.

The high velocity airstream which passes over the models in the test section can be either air or gases such as nitrogen or helium.

To obtain pictures of airflow around models, particularly shockwaves, gas is forced through a screen charged with high voltage, causing it to glow, so that density or pressure variations around the model will be visible for observation and photography.

New Test Procedure Devised For Fuels

A new technique, considered to be a major improvement in the evaluation of fuels on the basis of knock ratings, has been developed at the Texas Co. laboratories, Beacon, New York, in conjunction with the Hagan Corp., Pittsburgh, Pa.

Fuel-air ratio and temperature control equipment has been designed for testing gasolines under supercharged conditions, permitting a direct comparison of anti-knock characteristics of various fuels throughout the entire range of usable fuel-air mixtures and temperatures.

The new equipment consists of two devices—one which makes temperature sensitivity measurements, and a second (developed by the Hagan Corp.) which accurately checks fuels of unknown performance against those of known performance at the same mixture ratio.

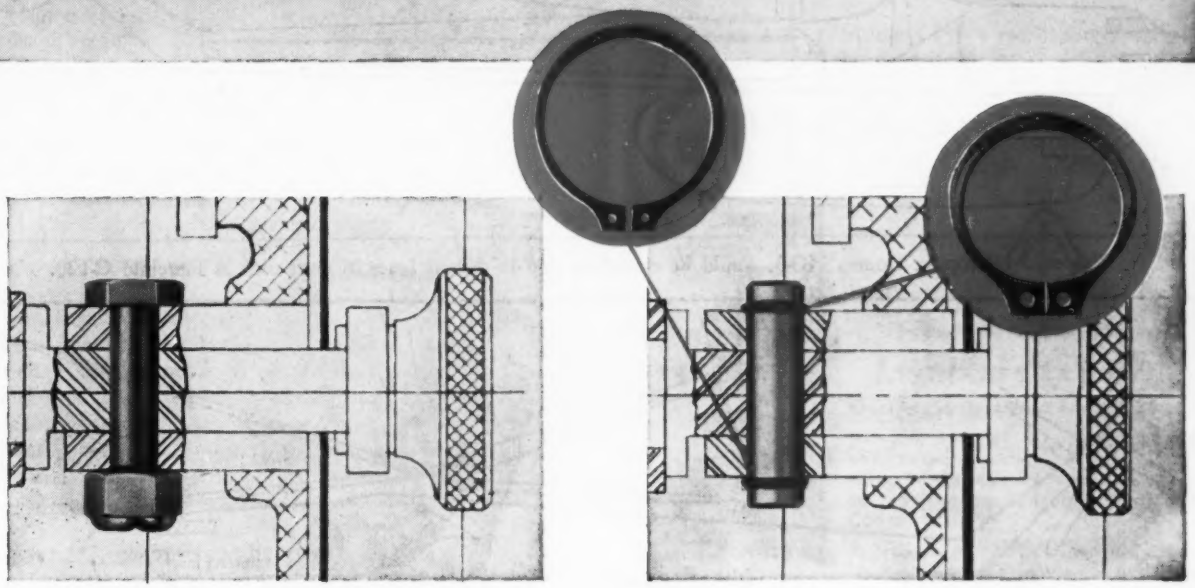
These devices eliminate time-consuming adjustments of fuel-air ratios and mixture temperatures and permit tests to be completed within a fraction of the time formerly required. It is this reduced time element which overcomes the variations in test results, previously a major drawback.

The development permits study of the established principle that temperature of the fuel-air mixture entering an engine cylinder has an important effect on fuel anti-knock quality and performance.

If an aviation fuel does not have proper anti-knock characteristics at the mixture ratios being used, it becomes necessary to enrich the mixture ratio to obtain desired performance. Fuel consumption sometimes is increased as much as 25 percent for this reason.

The new procedure will help overcome this problem by permitting a definite check of the anti-knock qualities of test fuels, insuring that they will have required performance quality.

Truarc saves 5 minutes, 9 cents in materials per unit without re-design of electric sanders



OLD WAY

Special ¼" cap screw and ¼-28 fibre-insert nut holds idler arm and pulley assembly on Model A3 "Take-About" Sander, Porter-Cable Machine Company.

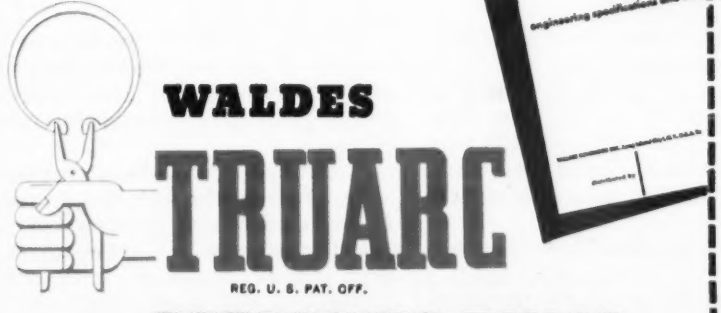
NEW WAY

Simple ¼" C.R. shaft, grooved in automatic screw machine, equipped with Waldes Truarc Retaining Rings. Bowed external ring (#5101-25) at top exerts resilient pressure taken up by Standard external ring (#5100-25) at bottom. Assembly is secure against vibration, can be easily taken apart and re-installed many times with same Truarc rings.

Every sander through the production lines costs 9 cents less for materials, requires 5 minutes less labor —with just the simple change from cap screw and nut to Waldes Truarc rings by Porter-Cable Machine Company, Syracuse, New York. The change to Truarc required no new design, no alterations in castings, but just the reappraisal of old methods.

Truarc can help you cut costs and increase production, too. Wherever you use machined shoulders, nuts, bolts, snap rings, cotter pins—there's a Truarc ring that does a better job of holding parts together. All Waldes Truarc Retaining Rings are precision engineered, remain always circular to give a never-failing grip.

Send us your drawings. Waldes Truarc engineers will be glad to show how Truarc can help you.



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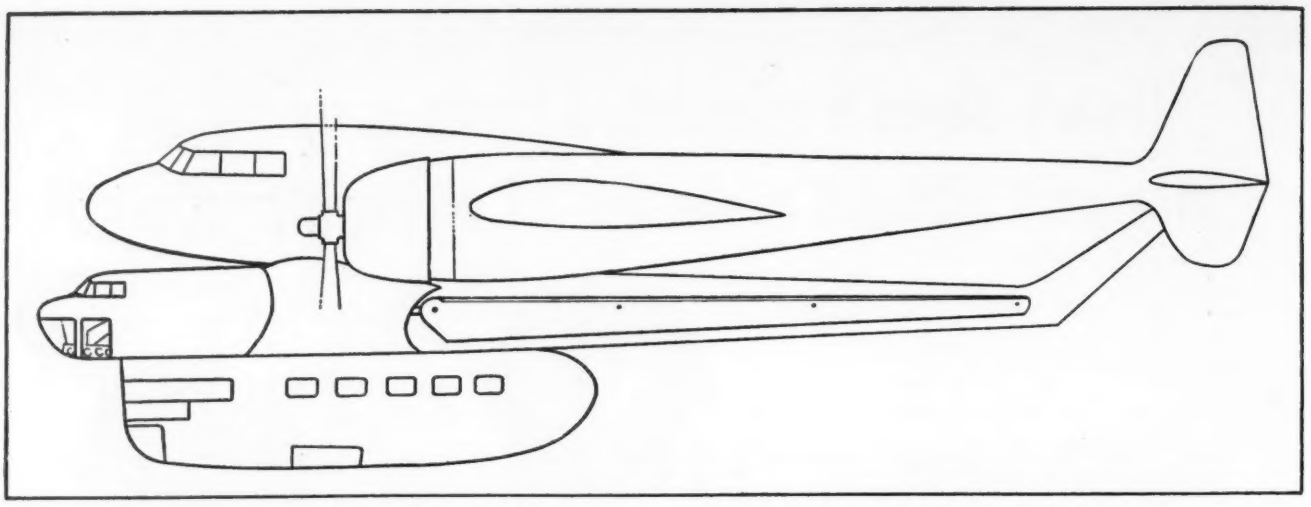
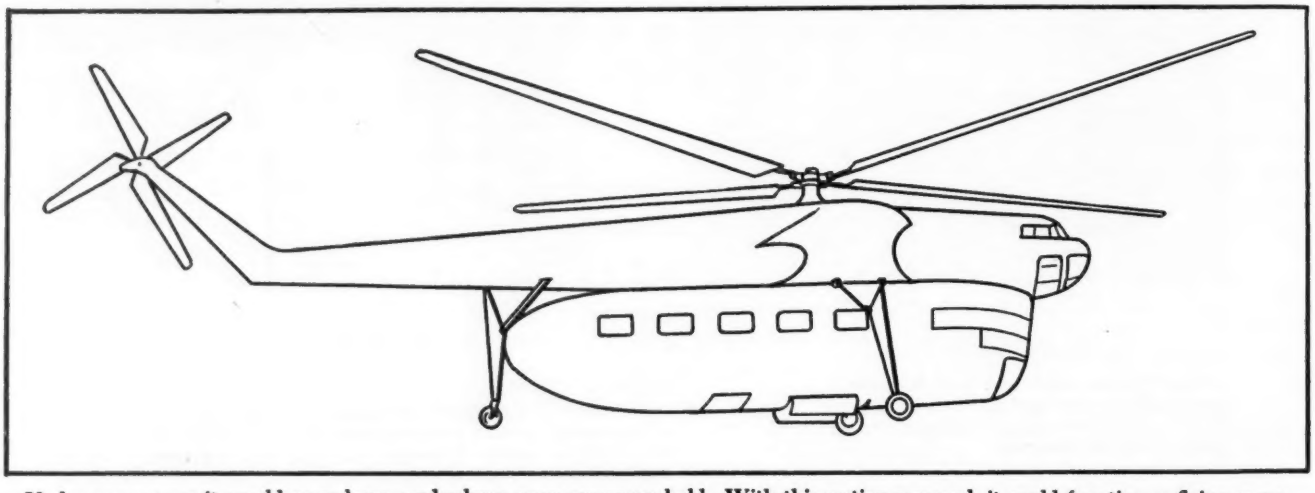


Proposed helicopter, Doman HC-3, would be carried as pod to distant bases by craft such as Fairchild C-120.



Under own power it would carry large, underslung cargo-passenger hold. With this section removed, it could function as flying crane.

Pod-Copter Design Accents High Utility

Proposal for rotorcraft to be hauled by C-120 type embodies rescue, cargo, crane, transport features.

Design specifications for a long-range rotary wing craft—the HC-3—capable of being carried as a pod by a fixed-wing aircraft of the Fairchild C-120 type, have been formulated by Doman Helicopters, Inc., Danbury, Conn. This design proposal is the result of Doman's own conception of the requirements of many branches of the Armed Forces.

The configuration, featuring a single rotor, is based on the philosophy that a large size copter should be easily and quickly transportable to the area of operations, and be adaptable to carry out a wide variety of missions.

The design is intended to permit the craft to function in these roles:

- Rescue helicopter, capable of retrieving the entire crew of a combat bomber in a single flight from a base as far as 700 mi. distant.
- Cargo carrier, to haul a 6600-lb. normal load, non-stop, a distance of 110 mi., or 1300 lb. for 1400 mi.
- Flying crane, capable of moving a 12,000-lb. object across a river, from ship to shore, or to a generally inaccessible location, by using carrying attachments in place of an underslung cargo unit.
- Transport, to carry 33 men, in addition to the two-man crew.

Although the copter is designed to be ferried over 1700 mi., non-stop, disassembly of only the main and tail rotor blades will permit it to be attached to the belly of a C-120 for a quick dash to far bases.

▶ **Design Philosophy**—Underlying element claimed to make this design a highly promising proposal is the ability to extend the blade length with rotors of the Doman type. Freedom from center-of gravity limit, control and structural vibration, and fatigue, reportedly afforded by the Doman rotor in smaller helicopters, is said to be maintained in the 87-ft. rotor of the HC-3.

These problems, which have produced difficulties where conventional articulated blades are used in single-rotor machines of moderate size, have led designers to think in terms of two or smaller rotors where gross weights approached 8,000 lb.

Inherent unbalances incident to the flapping of articulated blades have also resulted in undesirably tight center-of-gravity placards on licensed single-rotor copters.

Use of two rotors reduces or removes some of these obstacles, but is stated to introduce vexing problems of torsional surging in the interconnecting drive system.

Also reported as unavailable in the multi-rotor types is the inherent safety that single-rotor ships possess in conditions of partial loss of control, because

Estimated Performance of HC-3

At Design Gross Weight At Sea Level

Design gross weight	18,000 lb.
Empty weight	10,400 lb.
Normal rated power	2080 bhp.
Normal rotor speed	110 rpm.
Normal engine speed for takeoff	2440 rpm.
for cruising	1700 rpm.
Cruising speed	110 mph.
Maximum speed	135 mph.
Hovering ceiling (no ground effect)	15,000 ft.
Rate of climb (first minute)	1700 fpm.
Fuel consumption, normal cruising	473 lb./hr.
Normal overload gross	24,300 lb.
Max. single-engine-gross	16,700 lb.
Fuel Consumption, cruising, single engine	770 lb./hr.

Dimensions

Rotor diameter, main	87 ft.
Rotor diameter, tail	20 ft.
Fuselage length, overall	68 ft.
Height, excluding tail blade	17 ft.
Landing gear tread	13 ft.
Blades, main rotor	4
Blades, tail rotor	4

minor control difficulty usually results in complete loss of trim between the two rotors.

► **Fuselage**—Main section of fuselage carries engine, overdrive and rotor head. It is of welded tubular construction with detachable fairings. This section also includes the fittings for attachment of cargo unit, passenger cabin or heavy object in flying crane work, and has landing gear attached.

Cargo section may be removed for delayed unloading and it may be pre-equipped as a radar station, medical room, field office, etc.

Center of gravity range claimed permissible with cargo in place is 3 ft., with no effect upon vibration, stress or control.

Two engines are used—Wright 736 C 9HDs (1820 cu. in.), each affording 1040 bhp. at 2440 rpm. at 12,000 ft.

► **Rotor**—This unit incorporates the Doman system comprising sealed, oil lubricated mechanisms. It includes the final stages of the transmission (ratio 6.25:1), azimuth plate, and slave cylinders of the control system.

Gears are readily removed for service or inspection without disturbing any other mechanism or removal of main rotor blades.

There are no hinges, dampers or accompanying pitch control complexities, all bearings are lightly loaded.

► **Blades**—Both the main and tail blades are constructed of spruce ribs and mahogany skins mounted on a plastic-bonded birch laminated leading edge spar protected by a Nylon abrasion sheath. The full span trim tab in the trailing edge is preset for easy control.

Blades are joined to hubs by tubular steel spars that extend 20 percent of the radius. The spars are retained at hub and blade by forged fittings that exclude bolts, pins or other stress raisers at all sections subject to vibratory load.

The rotor is started through an hydraulic coupling rather than the usual friction clutch. This device is locked out at normal speeds to exclude losses to slip, but it continues to function as a powerful dampener of torsional vibrations and surges.

Test Landing Effect On Packaged Cargo

An instrument designed to determine landings effects and other flight conditions on packaged, finished products was recently given its initial commercial airline flight test under the safe transit program sponsored by the Porcelain Enamel Institute. Cooperating in the experiment were Air Cargo, Inc., and Trans World Airlines.

Crated much like any other package, the device—known as a two-way ride recorder—was shipped from Mansfield, Ohio, to the West Coast, then to the East Coast and back to the starting point. Results of the test run have not yet been made available.

PEI's safe-transit committee was established last year to aid manufacturers in determining whether their products are properly crated to withstand normal handling in transit.

An Invitation To

INVENTORS

Here is the rare opportunity that inventors have been waiting for—to show their inventions at their own exposition and get attention and interest from the public and industry. The primary purpose of this Exposition is to aid inventors in the promotion of their ideas to public and industrial leaders.

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Sponsored by the American Inventors Association

The International Inventors Exposition is open to any inventor who has any invention — regardless of kind or application — which has merit in the opinion of the Exposition Committee.

In order to make it possible for private inventors to exhibit at the Exposition on an equal footing with commercial entrants, the A I A (American Inventors Association) has made special arrangements for them to join the Association and present their exhibits at a greatly reduced fee.

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CEE-BEE CASE STORY #71

An actual Service Experience

This airline flies 60 aircraft of various types

Former method consists of complete polishing at engine change (approx. 1000 hrs.), plus cleaning with 3 materials; in addition to frequent intermediate cleaning to remove oil and dirt.

Polished appearance lasted little more than two weeks. Surface became progressively more grey, dull and dirty. This airline was unable to maintain clean, bright aircraft except with prohibitive lay-up time, and excessive costs.

Operator designated 3 two-engine aircraft for 1000-hour service tests, using Cee-Bee A-3 for brightening, Cee-Bee Alumaloy A for cleaning. Cee-Bee procedures to be followed precisely.

1. At engine change period (1000 hours) aircraft were cleaned with Alumaloy A to remove oil, sludge, traffic film and dirt; deoxidized, brightened and passivated with Cee-Bee A-3.

2. Every 200 hours aircraft were cleaned with Alumaloy A.

$20,000 savings; Bright-Clean Aircraft

Based on this test, this operator estimates savings in his fleet maintenance costs of $20,000 each 6 months. Each airplane is easily kept in Bright-Clean condition *at all times*.

Your planes, like those in Case Story #71, can be Bright-Clean at all times—not just after major overhaul. Cee-Bee A-3 and Alumaloy A, used in a consistent program as recommended by Cee-Bee, produced the important results in this Case Story. They can do it for you.

See for yourself how Cee-Bee's Bright-Cleaning Procedure produced these results. Write today for detailed comparative information.

Small Plane Owners! **Cee-Bee's cleaning procedures are not restricted to air fleets. You, too, can keep your school, corporation or personal plane Bright-Clean at all times. Write for information and name of distributor in your area.**

CEE-BEE

CEE-BEE CHEMICAL CO., Inc., AVIATION DIV.

655 EAST GAGE AVENUE • LOS ANGELES 1, CALIFORNIA

Lighting Studied

Cockpit red illumination lacking unless sufficient power is maintained.

Psychologists of the University of Rochester have completed a study of human factors in aircraft instrument lighting, which indicates that although red light is best for dark adaptation in night-flying aircraft, its brightness must be maintained above a critical level if maximum speed and accuracy of instrument reading is to be assured.

The study was undertaken as part of a contract with the Aero Medical Laboratory, Engineering Division, in conjunction with the All-Weather Flying Division, both of Air Materiel Command.

▶ **Developments**—The problem of cockpit lighting—an important consideration for more than 20 yr.—became of critical interest during World War II, when night combat flying became prevalent. It was further emphasized with the advent of the night-fighter specially designed for radar operation.

One of the earliest developments in night instrument-lighting was the use of ultra-violet "black" light, which illuminated dial numbers, pointers and scale divisions painted with fluorescing phosphors.

A more recent development is the use of red light on markings of flat white or fluorescent whitish paint.

Both methods were designed to provide adequate instrument lighting while maintaining the dark adaption of the pilot or crewmember.

▶ **Difficulties Enter**—A number of difficulties have been experienced with both methods. For example, fluorescent lighting produces complaints of "fuzziness" and "floating" of the instruments. The commonly used phosphors also emit light composed of short and medium wave lengths which are damaging to dark adaptation.

Red lighting is produced through the use of filters that necessarily absorb a large percentage of the total visible energy flux emitted by a lamp source. This means that to achieve a satisfactory brightness level of red lights on instruments it is necessary to use relatively powerful sources, bringing attendent problems of space, heat dissipation, etc.

▶ **Monochromatic Advantage**—Monochromatic light for night illumination of airplane cockpits is advantageous because it provides increased visual acuity at very low levels of illumination. This advantage disappears, however, at levels above 0.1 ft.-lumen.

The reading of instrument dials at

night may fall well within the favorable condition and, therefore, this factor is of primary interest.

► **Filter Problem**—Narrow band filters produce light of nearly monochromatic properties but have a maximum transmission of not more than 10-20 percent over a narrow band of wave lengths, falling quickly to zero on either side of this band, thereby transmitting a very small fraction of the total light flux incident upon them.

To solve this problem, "cut-off" filters have been developed that aid the condition by a transmission pattern that drops off sharply towards the short-wave end of the spectrum while exhibiting 85-90 percent transmission at longer wave lengths, thereby passing a greater portion of the total light flux.

► **Tests Conducted**—Having determined that sheer *amount* of light is an essential factor in low-visibility instrument reading, the University of Rochester carried out a series of tests to determine the accuracy of instrument reading in relation to colors used.

Four colors, each at two different illumination levels, were used by 20 subjects. Criteria for the tests included: (1) Illumination levels to be studied should lie above and below 0.02 ft.-lumen, (2) sharp "cut-off" filters should be used, and (3) attention should be directed towards the red-organge-yellow end of the spectrum, since a compromise between sufficient light flux and dark adaptation will probably be found in this region.

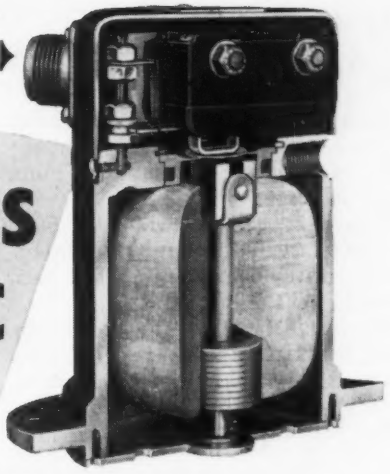
► **Level Limits**—The tests showed that instrument reading accuracy was highest at the 0.1 ft.-lumen level and lowest at the 0.01 ft.-lumen level for all colors examined. The subjects were required to read 50 dials with a given color and brightness level and the time in seconds was noted. The tests proved that accuracy was impaired at the 0.01 ft.-lumen level but that differences in color had little effect.

Principal conclusion of the study is that any color may be used, provided brightness is maintained above a critical level, 0.1 ft-lumen being considered the minimum level for acceptable accuracy.

Since red light had been found the best color for dark adaptation, the general conclusion of the tests approved red light as an instrument luminate provided its brightness is maintained above 0.1 ft.-lumen.

One particular facet of red cockpit lighting will bear careful study and evaluation in collaboration with flight crews. Red emergency handles and switches, under red light, appear either white or such a pale shade of red as to lose their signal effect almost entirely, while any writing done with a red pencil on white paper becomes almost, if not entirely, invisible.

Cut away section of Aerotec Sealed Float Switch. Switch is actuated by Alnico Magnet through Beryllium Copper Seal.



CONTROLS BY AEROTEC

. . . specifically designed for Military Aircraft . . .

Thousands of Aerotec Switches, Controls and Valves served on fighters, bombers and other types of military aircraft during the war.

With the cessation of hostilities, these controls were modified to the needs of commercial aircraft and, in some cases, even to industrial uses.

The quality, in design and engineering, of Aerotec Switches has not changed, it is an accepted fact both by the Army-Navy and manufacturers of commercial planes. The same care that gave these controls outstanding performance records in combat, is used in the manufacture of Aerotec equipment today.

A list of Aerotec equipment will be convincing:

Aerotec PRESSURE SWITCHES
Bellows type (controls manifold water injection).
Fuel pressure.
Altitude and Flow Indicators.

Aerotec SENSITIVE PRESSURE SWITCHES
Ultra Sensitive Switch (1/100" W.G. differential)
Ram Air Pressure Switch (for Air Speed Indication)

Aerotec VALVES . . . for any liquid application that will not corrode brass.
Float Valves
Pressure and Vacuum Relief Valves
Vent Valves
Reducing Valves

Built to Army-Navy standards, these Controls, Switches and Valves are now being installed on many of the latest type planes . . . a tribute to the continuing research and development of the control division of the Aerotec Corporation.

For information on these instruments, contact our Field Engineer in your territory, or write us direct.

AEROTEC

Sales and Project Engineers

THE THERMIX CORPORATION
First National Bank Bldg. Greenwich, Conn.
(Offices in 28 principal cities)

THE AEROTEC CORPORATION
GREENWICH CONNECTICUT

Air Force Tower To Test Parachutes

An installation for testing parachutes at speeds up to 500 mph. is currently under construction at Muroc Air Force Base, Calif.

Parachutes will be whirled around the top of a 120-ft. tower by a 2800-hp. electric drive mechanism to test their strength, reliability and design.

The installation, expected to be completed in 1950, is being erected according to Air Force specifications by C. Frederick Wolfe, Inc., New York City.

Parachutes will be mounted in a nacelle attached by a cable to a revolving boom at the top of the tower. Nacelle will operate on a principle similar to that employed in a fly-ball governor.

A firing device will release the chute when the nacelle reaches a preset speed and position on the circular path, to simulate the opening shock occasioned during a bailout from a speeding plane.

To provide the extremely wide speed range desired a drive, developed for wind tunnel use by General Electric Co., is being adapted by that company for the new installation.

The 2800-hp. drive system consists essentially of a vertical shaft in the tower powered by a GE synchronous motor. Reduction gears will translate the horizontal power of the motor drive shaft to vertical power of the main tower shaft.

Top peripheral speed of the parachute nacelle when fully extended will be about 500 mph. while the vertical drive shaft will range between 8.2 to 41 rpm.

Variable frequencies required for this adjustable speed will be obtained through the use of a GE induction frequency converter unit. By using a synchronous motor on the load, speed of the load remains in step with the frequency as it varies.

With an installation on the ground where testing can be controlled, it will be possible to observe, more closely than before, effects sustained by parachutes, and to photograph them for study.

Until now, chutes have been tested by loading them with weights and dropping them from aircraft.

Aircraft Steels Also in Stock

Phone for Quick Service

To serve manufacturers participating in the air force program, Ryerson service now includes steels meeting Army-Navy Aeronautical specifications. Many types of aircraft quality alloys and aircraft quality stainless are ready for quick shipment from convenient Ryerson stocks.

When you use Ryerson aircraft alloys you not only meet government "specs." You also have an extra assurance of dependable performance because we test every heat for hardenability and send the test results with your steel.

For extra dependability in aircraft stainless steel we stock Allegheny stainless made by America's first and largest stainless producer.

Of course we continue to offer quick service on standard specification steels as well—and our stocks of alloy, stainless and tool steels are unusually complete. So for quick service on steel-from-stock requirements—aircraft or standard specification—call your nearby Ryerson plant.

RYERSON STEEL

Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco

Jet Metals, Lubricants Studied Via Electrons

The search for improved metals and lubricants for jet engines is being stepped-up with the aid of an "electronic diffraction instrument" developed by the Special Products division, General Electric Co., Schenectady, N. Y.

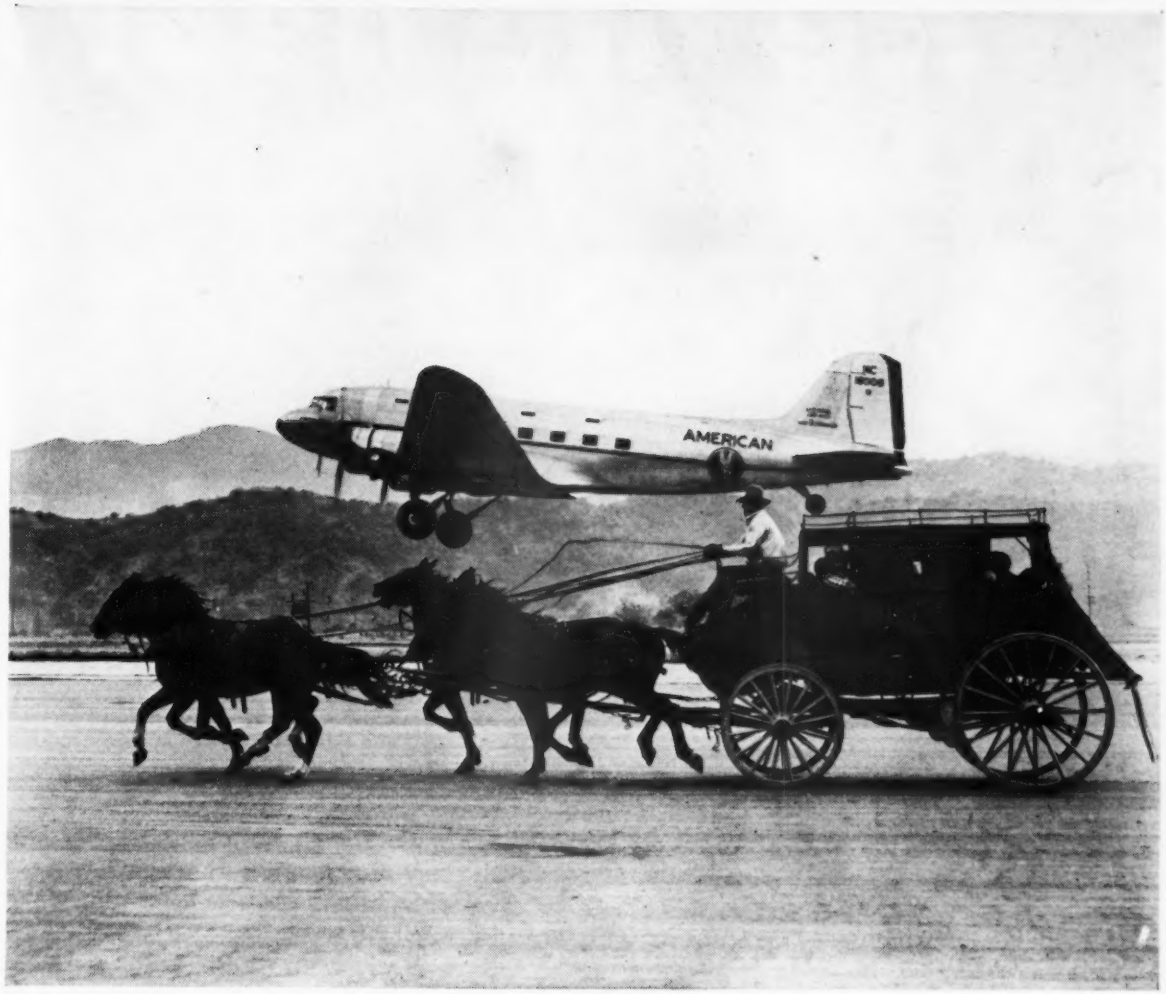
Engineers of the National Advisory Committee for Aeronautics are using the device to detect natural films which emanate from steel parts and chemical changes produced on metal surfaces by various lubricants at high speeds and temperatures.

Knowledge of these chemical changes is desirable for development of metals and lubricants adaptable to jet engine operating conditions. Formerly, the changes could not be detected.

By subjecting metal parts to temperatures and speeds imposed by jet engines, and examining them with the instrument, researchers have been able to identify specific film materials deposited on bearings during engine operation. The device also has been used effectively in the study of friction wear, corrosion, and surface deposits.

In operation of the instrument, electrons are "boiled off" a white-hot tungsten filament and focused into a beam by a magnetic "lens." For one type of work, the beam is passed through a two-millionths-inch-thick metal section and produces an image on a fluorescent screen or on ordinary film.

In other applications, the beam is directed to a metal surface at an angle. Tiny projections on the surface diffract the electrons and form an image.



This month A GRAND OLD PLANE *makes its last flight!*

Outmoded by finer, faster, more modern transports, the Douglas DC-3 makes its last passenger flight for American Airlines this month. It is being retired, as was the DC-4 last year, to make way for progress.

Although change is the inevitable price of progress in air transportation, the passing of the DC-3 is tinged with regret. For this was no ordinary aircraft. For years it maintained an almost personal reputation for reliability and sound performance, not unlike the famous Model T Ford. Every solid inch was pure thoroughbred!

The first DC-3 was purchased over a decade ago by American—in August 1936. Since it then represented the ultimate in transport luxury, American Airlines subsequently converted its entire fleet to this new type. The DC-3 carried 21 passengers at 200 miles an hour—small and slow when compared to the Flagships of today. In 1949, American's new Flagships, the DC-6 and the Convair, accommodate 52 and 40 people respectively and travel 300 miles an hour!

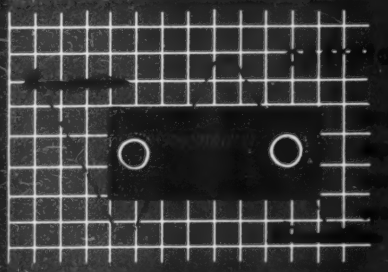
The DC-3 will doubtless continue to serve the public in a limited way, just as the old Ford Tri-motor did, but no longer will it be seen on American's far-flung routes where it starred so long. Oldtimers, passengers and pilots alike, will mourn the passing of this grand old plane, inevitable though it be. Its retirement from the Flagship Fleet is symbolic of the ever recurring changes we must make to maintain American's leadership in air transportation's progress.

AA **AMERICAN AIRLINES** INC.

twice the heat in

designers

...w/ lightweight compactness, large ...acity, very low ventilating air ...ssure drop—for pressurized or ...n-pressurized installation.



...ors

...g service life—safe, proven ...pendability under all conditions ...r ground level to high altitude— ...erates on gasoline or jet fuel.

ground crews

strong, simplified construction. Radiant tube and plugs readily removed without disturbing heater. Standardized parts are easily interchangeable.

the revolutionary new radiant tube development is available on the two newest additions to Janitrol's world famous line of aircraft heaters: the S-200 and S-700—both built to latest military and commercial heater standards.

In test after test, the revolutionary new radiant tube principle has been proven to give greater-than-ever efficiency, strength, compactness, light weight . . . and overall dependability.

Here's how radiant tube heaters deliver more heat per pound of installed weight: Ram air enters the primary combustion chamber (radiant tube) at a tangent, forces the pressure-atomized fuel spray (ignited by single terminal spark plugs) into a tight-spiral, self-sustaining, whirling flame. There are no hot-spots. Heat distribution is

unif
speci
cause
as a
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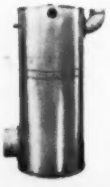
S-200

S-700

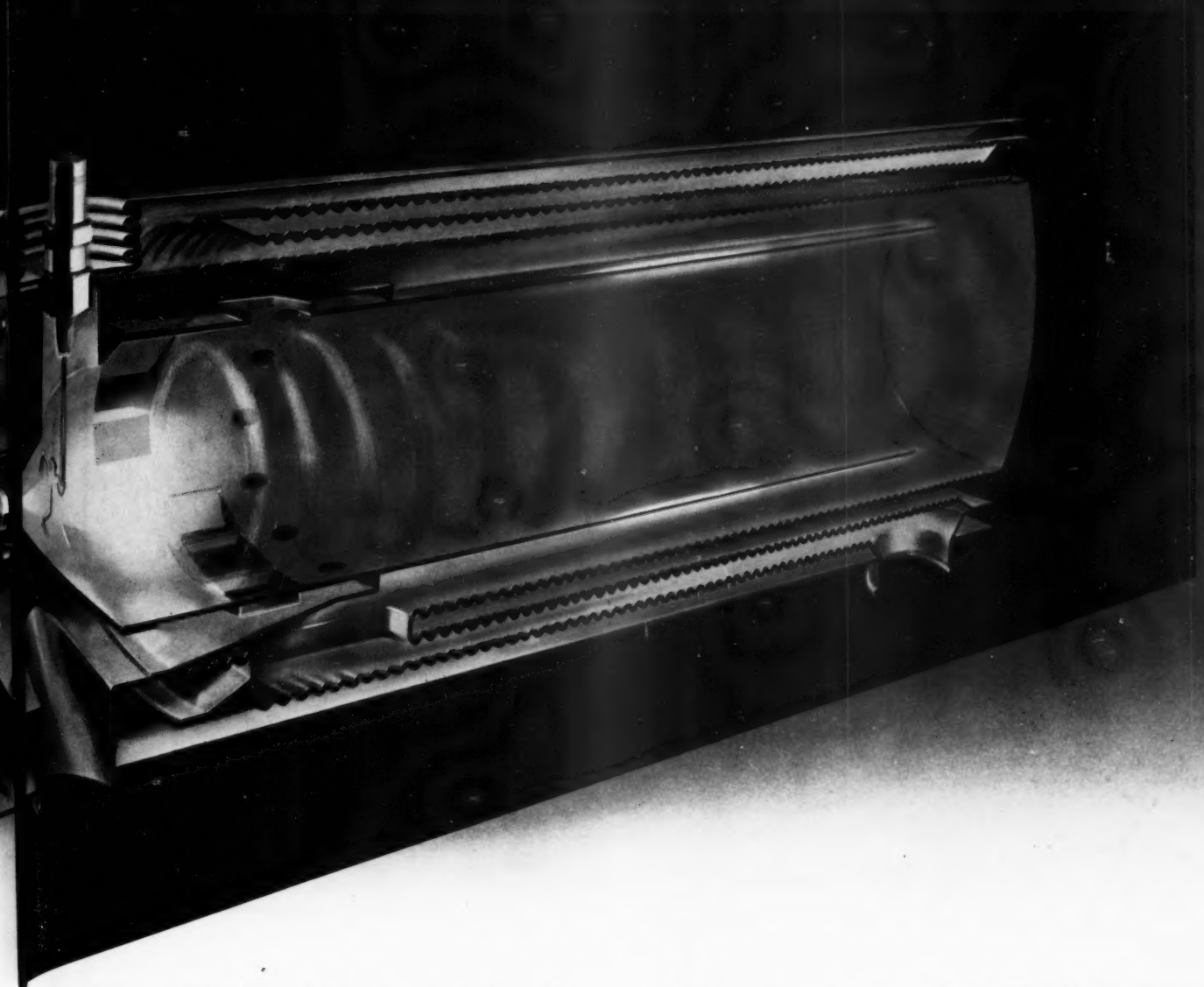


S-300

S-125

S-100

half the space



uniform . . . The flame then doubles back through the specially corrugated, secondary combustion chamber. Because the primary combustion "tube within a tube" acts as a high-temperature radiator, heat transfer surfaces are exposed to a radiant as well as convected heat. This key factor eliminates need for excessive multiples of thin wall heat transfer surfaces and ventilating air passes.

Greater design freedom is afforded by important reductions in size, weight, and ventilating air pressure drop.

Greater insurance of dependable operation is provided by the simple, sturdy construction (achieved after years of experiments). Heat transfer surfaces are made of special high nickel alloy, specially corrugated by Janitrol's own process.

Maintenance is simple and routine—again through *advanced design.* Plugs are removable from outside heater. Radiant tube assembly is also removable, and all parts are standardized for interchangeability.

For complete details on this important forward step in aircraft heating, call your nearest Janitrol representative.

S-50

S-25

V-15

Janitrol

AIRCRAFT AND AUTOMOTIVE HEATERS *with the whirling flame*

AIRCRAFT - AUTOMOTIVE DIVISION • SURFACE COMBUSTION CORP., TOLEDO 1, OHIO

BREAD... so millions may live!

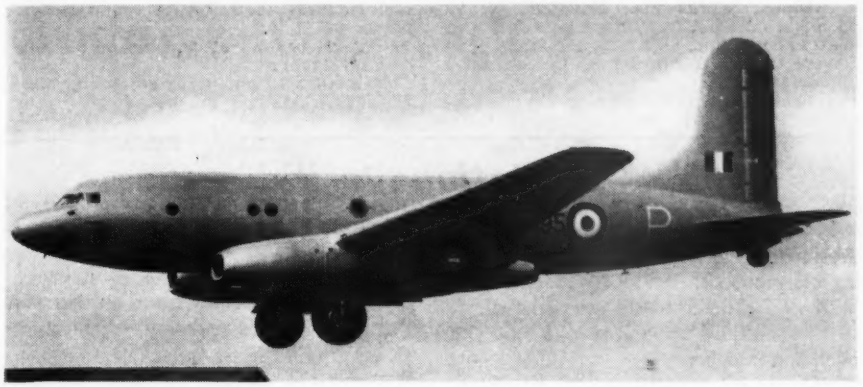
Out of a Berlin bakery, this German child trundles bread made from flour flown in by American pilots in Douglas planes.

A marvel of modern mass transportation, the Berlin Air Lift was made possible through the courage and efficiency of Air Force personnel, *plus* the foresight and creative skills of Douglas craftsmen and engineers. For, ready to meet this need—as they were ready to meet the needs of war—were fleets of Douglas DC-4s (Army C-54... Navy R5D) —backbone of the Air Lift.

Realizing the vital importance of *dependable* air transport—both military and commercial—Douglas continues to pioneer new transport models. Now under construction is the new DC-6A air freighter capable of flying loads up to 30,000 lbs. at 300 mph. Future operations, utilizing the DC-6A, will require half as many planes, three-fourths the men, and reduce operating costs one-third, compared with present Berlin Air Lift requirements.

DOUGLAS AIRCRAFT COMPANY, INC.

PRODUCTION



Britain's Tudor series may make a comeback with the jet-powered Tudor VIII, now undergoing a new series of tests. It is being fitted with a pressurization system designed to meet demands of forthcoming high altitude tests ranging up to 44,000 ft. To date, the plane has not been flown above 20,000 ft. The Eight has attained a true airspeed of 430 mph. at 18,000 ft. Its manufacturers claim it is the world's fastest transport.

What Is the Future of the Tudor?

Tudor IVs, withdrawn from passenger service, now will be tried on airlift; other models being built.

(*McGraw-Hill World News*)

LONDON—The Tudors have added another sad episode to their saga.

With the agreement of British South American Airways, the only carrier operating Tudor IVs, the Minister of Civil Aviation announced that the Fours would be withdrawn from passenger service and converted into freighters for use on the Berlin airlift.

Action was not unexpected, after the loss of BSSA's "Star Ariel" on Jan. 17 while the plane was on a flight between Bermuda and Kingston, Jamaica.

▶ **Second Mystery**—The Minister pointed out that if it had been possible to explain the loss the "Star Ariel" by any cause which might have been remedied in the remaining aircraft of this type, it would perhaps have been possible to continue the Tudor IVs in passenger service. But since the "Star Ariel was lost without a trace, just as was another Tudor IV a year ago, the Ministry had decided that the psychological reactions of the traveling public would be such as to make it advisable to ban all the Tudor IVs from passenger service.

The four BSAA Tudor IVs which are affected by this decision will be modified according to the type of cargo they will carry, and will be operated by BSSE crews when they are transferred to the airlift.

BSAA already is operating on the airlift its five Tudor Vs—a slightly-different version of the Tudor. These Fives, originally intended for passenger-service with BSAA, have had their seats removed and five tanks installed in their place. Each plane can carry an average load of 2300 gal. of gasoline or 2000 gal. of fuel oil per trip.

▶ **More Being Built**—Sixteen more Tudor IVs are under construction at the Manchester works of A. V. Roe & Co. Ltd. These planes, most of which are nearly complete, are modifications of the original Tudor Is, converted by adding an additional six-foot section to the fuselage. These planes, as a consequence of the Ministry's decision, will be adapted for cargo-carrying and also used on the airlift. As yet, it has not been decided who will operate them.

BOAC had been expected to take over some of these 16 Tudor IVs, but early in January the Corporation notified the Ministry of Supply (which had ordered the production) that it was unwilling to buy them unless the price was drastically reduced. Here is the record of the Tudors:

▶ **Tudor I**—Two prototypes and sixteen production models were ordered.

First prototype subsequently was converted into the longer-fuselage of the Four and later converted again, by the installation of four Nene turbojets, into the present Tudor VIII, which is doing research flying for the Ministry of Supply.

The second prototype still exists as such.

Sixteen production models were completed, then rejected by BOAC, and are now undergoing conversion into Tudor IVs. One of these conversions actually was completed and became the "Star Ariel."

▶ **Tudor II**—Two prototypes and fifty production models were ordered.

One prototype crashed (killing AVRO's chief designer, Chadwick.)

The second prototype is being operated on the airlift by Air Vice Marshal D. C. T. Bennett's charter company, Airflight Ltd.

One production model was modified by the incorporation of Hercules engines instead of Merlins and became the Tudor VII. This plane now is flying at the Ministry of Supply's Telecommunications Research Establishment, on radar research work.

Two production models are doing research flying for Supply Ministry.

Six production models were completed in the seating arrangement desired by BSAA, and were designated Tudor Vs. Five of these BSAA Fives, as noted, were stripped of their seats and converted into tankers, and are flying on the airlift. The sixth, converted into a cargo-carrier, is being operated on the airlift by Bennett's company.

Five additional production model Twos are being completed but with four Nenes instead of the Merlins, and probably with tricycle undercarriages, in order to change the direction of the jet exhaust while on the ground and avoid damage to the runway. This modification is designated the Tudor IX.

Of the components constructed for the remaining 36 Twos, the Ministry of Supply has ordered the completion of ten freighter versions, modified to the shorter fuselage-length of the IVs, and probably altered to have a tricycle undercarriage. These will probably be given the type name of "Trader" to try to free them from the stigma which has come to be attached to the name "Tudor."

PRODUCTION BRIEFING

▶ **Boeing Airplane Co.** needs 1000 additional employes at its Wichita plant for the B-47 bomber production program. Particularly needed are skilled personnel for sheet metal assembly, tool fabrication, tool design, production planning and control and inspection.

▶ **Rheem Mfg. Co.** received contracts totalling $1.5 million for USAF and Navy to make pressurized steel shipping tubes for military aircraft engines. The tubes will be made at the firm's Sparrows Point, Md. plant. Initial contract calls for containers for the Pratt & Whitney Wasp Major piston engine.

Invitations and Awards to Industry by USAF

Air Materiel Command Procurement Division makes available to AVIATION WEEK the latest bid invitations and awards, shown on this page. Requests for further information should be addressed to Contracting Officer, AMC, Wright-Patterson AFB, Dayton, Ohio, attention: MCPPSX72.

Abstracts of Bid Awards

For 373,929 gal. naphtha (49-532):
Companies sharing—Sherwood & Co., Inc., Kansas City, Mo., on a bid of $19,462.37, and George Senn, Inc., Philadelphia, on a bid of $102,772.62.

For 5533 filter resistors (49-781):
Companies sharing—Sprague Electric Co., North Adams, Mass., on a bid of $634.62; United Transformer Co., New York, on a bid of $2722.50, and George T. Brownell, Marshall, Mich., on a bid of $117.60.

For 3168 cans luminescent material (49-844):
Companies sharing — Switzer Brothers, Inc., Cleveland, on a bid of $8522.40, and Physics Research Associates, Chicago, on a bid of $1716.

For screws (49-880):
Companies sharing—American Screw Co., Providence, R. I., on a bid of $35.80; Continental Screw Co., New Bedford, Mass., on a bid of $6072.04; Air Associates, Inc., Teterboro, N. J., on a bid of $1547.50, and Reed & Prince Manufacturing Co., Worcester, Mass., on a bid of $28,034.76.

For electrical equipment (49-929):
Companies sharing — Electric Industrial Equipment & Supply Corp., Baltimore, on a bid of $2761.40; Herman H. Smith Inc., Brooklyn, N. Y., on a bid of $183.60; E. B. Latham & Co., New York, on a bid of $695.94; General Electric Co., Inc., Dayton, O., on a bid of $13,980.04; Graybar Electric Co., Inc., Dayton, O., on a bid of $13,099.08; Midway Electric Supply Co., Inc., New York, on a bid of $1195.13; Gaffney-Kroese Electrical Supply Corp., New York, on a bid of $71.50; Westinghouse Electric Supply Co., Dayton, O., on a bid of $696.40; Howard B. Jones Division, Chicago, Ill., on a bid of $4746.88, and M. D. Larkin Co., Dayton, O., on a bid of $5433.87.

For 1250 stand assemblies (49-1110):
Armstrong Furnace Co., Columbus, O., on a bid of $72,060.

For 18,400 toggle switches (49-1261):
Companies sharing—Wood Electric Co., Newburyport, Mass., on a bid of $26,082, and Cutler-Hammer, Inc., Milwaukee, Wis., on a bid of $4620.70.

For 2000 jack assemblies (49-1341):
Industrial Precision Products Co., Chicago, on a bid of $2960.

For 33,610 lb. welding steel (49-777):
Companies sharing—Burdett Oxygen Co. of Cleveland, O., on a bid of $4750.79, and Victor Equipment Co., Chicago, on a bid of $1499.24.

For 24 lighting sets (49-828):
American Gas Accumulator Co., Elizabeth, N. J., on a bid of $37,540.20.

For 23 testers (49-994):
Ram Meter Service, Ferndale, Mich., on a bid of $22,041.

For 1100 cone & roller assembly (49-1018):
Companies sharing—Timken Roller Bearing Co., Canton, O., on a bid of $10,009, and General Motors Corp., New Departure division, Bristol, Conn., on a bid of $12,582.

For 75 checking devices (49-1058):
General Electric Co., Schenectady, N. Y., on a bid of $14,250.

For 600 radiators (49-1092):
G & O Manufacturing Co., New Haven, Conn., on a bid of $16,470.

For toluene thinner (49-1108):
Companies sharing—Indianapolis Varnish Co., Indianapolis, on a bid of $11,292.96; Moran Paint Co., Dayton, O., on a bid of $1815.84; United Chromium Inc., New York, on a bid of $453.60, and Texas Solvents & Chemicals Co., Houston, Tex., on a bid of $26,358.22.

For 22,740 copper bars (49-986):
Companies sharing — Belmont Smelting & Refining Works Inc., Brooklyn, N. Y., on a bid of $1446.05; American Brass Co., Waterbury, Conn., on a bid of $4821.61, and Revere Copper & Brass Inc., Detroit, on a bid of $8023.35.

For 1030 variac (49-1056):
Companies sharing—General Radio Co., Cambridge, Mass., on a bid of $7875.20, and Hughes-Peters, Inc., Dayton, O., on a bid of $8551.30.

For developer & oil flourescent penetrant (49-1113):
Magnaflux Corp., Chicago, on a bid of $13,216.20.

Invitations to Bid

Bid openings are 20 to 30 days after approximate issue dates shown in the following bid proposals. Bid sets containing specifications for items to be procured will be sent to qualified applicants who state bid invitation number.

One bid set will be available for examination without obligation by prospective bidders, after bid publication date, at each of the seven AMC procurement field offices. This will enable firms to see specifications before writing or telegraphing for their own bids sets.

Procurement field office locations: Boston Army Base, Boston 10, Mass.; Government Aircraft Plant No. 4, Ft. Worth 1, Tex.; 39 S. LaSalle St., Chicago 3; Wright-Patterson AFB, Dayton, Ohio; West Warren and Longo Aves., Detroit 32; 1206 Santee St., Los Angeles 54; 67 Broad St., N. Y. 4.

Current bid proposals:

Excluder Assembly, 1-9 items, bid invitation No. 49-1563, issue date Mar. 28, delivery 60 days.

Lamp, 1430 each, bid invitation No. 49-1564, issue date Mar. 28, delivery by May 30.

Lamp Assembly, 1405 each, bid invitation No. 49-1565, issue date Mar. 28, delivery by May 1.

Electrical Supplies, 120,835 each, bid invitation No. 49-1566, issue date Mar. 28, delivery by Apr. 30.

Radio & Radar Parts, 500 each, bid invitation No. 49-1570, issue date Mar. 28, delivery 60 days.

Radio Equipment, 1-3 items, bid invitation No. 49-1572, issue date Mar. 28, delivery 60 days.

Photographic Equipment, 1-2 items, bid invitation No. 49-1586, issue date Mar. 28, delivery by Aug. 1.

Tool Equipment, 4400 each, bid invitation No. 49-1589, issue date Mar. 28, delivery 30 days.

Testing Stand, 2 each, bid invitation No. 49-1590, issue date Mar. 28, delivery by July 1.

Cellulose Nitrate Lacquer, 1-3 items, bid invitation No. 49-1591, issue date Mar. 28, delivery 30 days.

Special Personal Equipment, 1-5 items, bid invitation No. 49-1594, issue date Mar. 28, delivery by June 15.

Radio & Radar Parts, 300 each, bid invitation No. 49-1597, issue date Mar. 29, delivery 60 days.

Radio & Radar Parts, 1-4 items, bid invitation No. 49-1600, issue date Mar. 29, delivery upon receipt of contract.

Stand Assembly, 700 each, bid invitation No. 49-1602, issue date Mar. 29, delivery 90 days.

Capacitor, 1-7 items, bid invitation No. 49-1601, issue date Mar. 29, delivery at once.

Photographer Equipment, 1-2 items, bid invitation No. 49-1579, issue date Mar. 28, delivery 30-45 days.

Dynamotor, 71 each, bid invitation No. 49-1569, issue date Mar. 28, delivery by Aug. 1.

Aircraft Flight Instruments, 1-2 items, bid invitation No. 49-1574, issue date Mar. 28, delivery by May.

Rubber Materials, 1-31 items, bid invitation No. 49-1585, issue date Mar. 28, delivery 60 days.

Rectifier, 1-2 items, bid invitation No. 49-1593, issue date Mar. 28, delivery by September.

Control Box, 71 each, bid invitation No. 49-1599, issue date Mar. 28, delivery by August.

Adapter Regulator, 1-3 items, bid invitation No. 49-1603, issue date Mar. 28, delivery by July.

Warehouse Equipment, 330 each, bid invitation No. 49-1604, issue date Mar. 28, delivery by July 1.

Radio Equipment, 1-10 items, bid invitation No. 49-1606, issue date Mar. 30, delivery best possible.

Electron Tubes, 1000 each, bid invitation No. 49-1609, issue date Mar. 30, delivery best possible.

Belting Leather, 1-20 items, bid invitation No. 49-1610, issue date Mar. 30, delivery 30 days.

Belting Leather, 1-20 items, bid invitation No. 49-1610, issue date Apr. 4, delivery 30 days.

Shear Strength Tester, 1-2 items, bid invitation No. 49-1621, issue date Apr. 4, delivery by July 1.

Base Assembly, 500 each, bid invitation No. 49-1630, issue date Apr. 4, delivery by May 1.

Goggle Assembly, 9600 each, bid invitation No. 49-1612, issue date Apr. 4, delivery 60 days.

Flight Progress Computer, 2265 each, bid invitation No. 49-1611, issue date Apr. 4, delivery best possible.

Asbestos, 1-4 items, bid invitation No. 49-1613, issue date Apr. 4, delivery 30 days.

Plastic Sheet Cellulose, 3 million sq. in., bid invitation No. 49-1617, issue date Apr. 4, delivery by June 1.

Iron or Steel Sheet Galvanized Flat, 1-5 items, bid invitation No. 49-1619, issue date Apr. 4, delivery 100,000 lb. per month.

Drier Assembly, 435 each, bid invitation No. 49-1622, issue date Apr. 4, delivery by Dec. 1.

Regulator Assembly, 29 each bid invitation No. 49-1625, issue date Apr. 4, delivery by May 1.

Cable, 25,000 ft., bid invitation No. 49-1626, issue date Apr. 4, delivery by May 1.

Photographic Equipment, 75 each, bid invitation No. 49-1629, issue date Apr. 4, delivery by Aug. 1.

Painting Brushes, 34,877 each, bid invitation No. 49-1616, issue date Apr. 4, delivery 20 percent monthly.

Resistor, 4000 each, bid invitation No. 49-1634, issue date Apr. 5, delivery 60 days.

Connector, 15,580 each, bid invitation No. 49-1635, issue date Apr. 5, delivery 45 days.

Radio Equipment, 955 each, bid invitation No. 49-1636, issue date Apr. 5, delivery best possible.

Relays, 800 each, bid invitation No. 1637, issue date Apr. 5, delivery 60 days.

Photographic Paper, 1-10 items, bid invitation No. 49-1638, issue date Apr. 5, delivery by May 1.

Table Assembly, 67 each, bid invitation No. 49-1642, issue date Apr. 5, delivery 90 days.

Clevis Assembly, 359 each, bid invitation No. 49-1650, issue date Apr. 5, delivery by May 1.

NEW AVIATION PRODUCTS

Additive Halts Wash-Water Freeze

Glycol in plane lavatory system insures water supply, protects piping.

A foreign Trans-Atlantic airline is experimenting with a liquid anti-freeze solution added to wash-water carried aboard its aircraft, in an attempt to eliminate annoyance of having washing facilities interrupted in flight and to prevent ruptured piping when the plane is parked in the open during sub-zero weather.

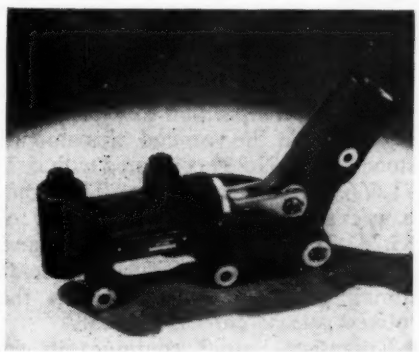
The product, propylene glycol, is made by Carbide & Carbon Chemicals Corp., 30 East 42nd St., N.Y.C. It has no odor or color, has no noxious effects on the skin, and is non-poisonous if taken internally.

The test solution used was made up of one part propylene glycol and three parts water. With this concentration, a slightly disagreeable, soapy taste was imparted to the water, although it did not sting the eyes. The water became normally sudsy. No unpleasant stickiness was felt after washing.

The anti-freeze properties of this glycol are as follows: In a 20 percent concentration by volume, freezing point of the water solution is 20 F.; with 30 percent by volume, freezing point is 8 F.; 40 percent gives −5 F.; and 50 percent gives −25 F. Thus, the product becomes proportionally more efficient as the concentration increases.

Propylene glycol is neither acid nor alkaline, and its corrosive action is approximately equivalent to that of water.

As with most glycols, if the temperature of a given solution of the product is reduced considerably below its nominal freezing point, it merely becomes slushy. Thus, although a water system might become temporarily inoperative, the plumbing nevertheless will remain undamaged.—G.C.

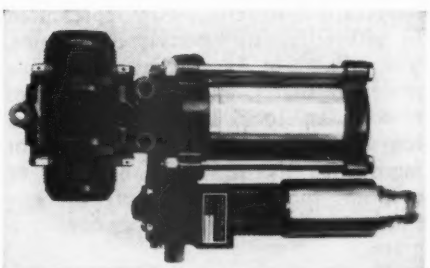


Pressure Via Hand

New model 3000-psi. hydraulic hand pump, approved as AN-6248-1, is announced by **Pacific division, Bendix Aviation Corp.**, 11600 Sherman Way, North Hollywood, Calif. Pump has ¾-cu. in. capacity and embodies extra rugged construction. Body is permanent mold casting, and forged handle socket is designed to resist extreme side loads as well as high operating loads. Unit employs double acting piston producing approximately equal volume on in and out strokes. Use of Bendix laminated phenolic poppet in integral check valve and superoilite bearings are intended to assure long life.

Torque Gager

Two new models of Trutorq beam stands, Models SDB-10 and SDB-50, made by **Airdraulics Engineering, Inc.**, New Canaan, Conn., provide wide range of torque measurement for testing power tools, setting and regulating torque of hand, testing pneumatic and electric power tools in production use, checking tightness of fastenings, and setting up torque standards. Model 10 has a range of from 0 to 50 oz.-in., calibrated in increments of ½ oz.-in.; Model 50 covers from 0 to 50 lb.-ft. in increments of ¼ or ½ lb.-ft. Units have ball-bearing beam fulcrum and are accurate to a fraction of the unit of measurement.



Controls Fluid Flow

New type solenoid-controlled gate valve for high-temperature application is announced by **Hydro-Aire, Inc.**, Burbank, Calif., as shut-off device for large fuel pumps, and to control flow of liquids, oxygen, air, alcohol, oil and water. It's reported to operate at ambient temperature ranges of −65 to 250 F., but is able to handle air or liquids up to 550 F. At 250-deg., approximate current consumption is 5.5 amp. at 17v. Solenoid is special holding type unit. With electrical failure, valve remains in last energized position. Opening time is adjustable from ½ to 5 sec. Closing time is less than 1/10th sec. Non-corrosive metal seals are used. Unit is easily serviced, is unaffected by dust, humidity or water and can be readily adapted to extremely high pressure conditions for fuel and engine oil systems.

For Hydraulic Testing

Hydraulic components test stand, Model PA 898-B, announced by **Pacific Airmotive Corp.**, 2940 North Hollywood Way, Burbank, Calif., is designed for testing cylinders, regulators, valves, accumulator, hoses, etc., operating at pressures up to 3500 psi. and 15 gpm. It's stated that infinite variable pressure and volume are obtainable to maximum limits. Features include electrically driven pump for static pressures to 10,000 psi. (Model PA 898-A incorporates hand pump); special heavy-duty pump (15 gpm. at 3500 psi.) driven by 3-phase electric motor; AN type elements for filtering fluid; large oil reservoir automatically maintained at set temperature; instrumentation comprising compound, temperature, and three pressure gages; flowmeters for reading both low and high flows; and welded steel construction with metal cabinet.

Eye Protection

Comfort and adjustability are major features of safety goggles, suitable for welding, chipping and grinding operations, manufactured by **Jackson Products**, Warren, Mich. Product is sold through distributors throughout the U. S. and Canada, one of whom, the General Scientific Equipment Co., Philadelphia, was erroneously described as the maker in AVIATION WEEK Mar. 7, 1949.

FINANCIAL

Airline Reports Show Contrast

Analysis credits American with best financial status among transcontinentals; Braniff position improves.

Airline annual reports for 1948 continue to afford interesting contrasts in achievement as well as in managerial philosophies.

American Airlines not only shows the largest loss for 1948 among the four transcontinentals but for the entire industry as a whole. Careful analysis, however, discloses that American probably made the greatest strides during 1948 and is in the best financial condition among the transcontinentals.

For the year ended Dec. 31, 1948, American reported a net loss of $2,893,671 compared to an adjusted net loss of $3,400,766 for 1947. During 1947, however, there was a substantial tax "carry-back" refund which was not present during 1948. The 1947 loss before this refund was $6,425,766.

▶**Grounding Pay**—The 1948 account does not reflect the reimbursement of the grounding losses awarded by the Civil Aeronautics Board in its February mail pay actions. Under this decision, CAB has fixed a tentative amount of $2 million each to be awarded American, TWA and United as a result of the DC-6 and Constellation groundings during 1948 and 1947.

If American had followed the same accounting treatment in this respect as did United, its 1948 loss would have been reduced by $1,500,000 for 1948, to $1,393,671. Similarly, 1947's net loss would have been reduced by $500,000.

This $2 million award is to be payable at the rate of $33,333 per month over a five-year period, starting June 1, 1948. Actually, however, CAB has not yet issued the proper orders which can set in motion the disbursement of such additional mail pay to the carriers. Moreover, because it had more planes grounded than United, American may look forward to ultimate payments exceeding the tentative $2 million.

▶**No Mail Plea**—Of particular significance is the complete absence in the text of the American report of any special plea for increased mail pay as a necessary element to profitable operations. Every other annual report issued thus far this year has placed great emphasis on mail compensation as an integral phase determining future results.

The only assertion made by American on this subject appears in fine print as a footnote to the financial statements, in which the company states that it has appealed to the Board for an increase in rates for the entire year 1948, as well as for a part of 1947, "but it is not possible at this time to determine the amount, if any, of additional mail revenue which may be received."

Another footnote calls attention to the fact that by direction of CAB, the company suspended depreciation on the DC-6s while they were grounded during 1948 and 1947. This adjustment decreased depreciation by $940,770 during 1948 and by $467,703 in 1947. Prior to this CAB recommendation, American had been charging depreciation against this equipment at the normal rates while other carriers operating DC-6 aircraft had, on their own, suspended such charges during the grounding period.

▶**Equipment Switch**—The accomplished fact of American's achievement is the complete transition to all new postwar aircraft and the retirement of DC-4s and DC-3s from regular passenger service. This in itself affords American with an important competitive advantage. Not disclosed in the annual report is the fact that American paid an average of around $225,000 each for its fleet of 75 Convairs. The asking price for this type of transport is now reported around $550,000.

American's postwar transition was accomplished at the cost of creating a huge capital structure, now represented by $40 million in 3 percent debentures, $40 million in 3¼ percent convertible preferred shares, and 6,452,835 shares of common stock. However, the carrier has all this behind it now and is not faced with the near-term necessity of entering the capital markets for any funds to finance any expansion program.

The American annual report concludes on an optimistic note declaring that "basic factors indicate that 1949 will be a year of opportunity for American . . . a year in which (it) will increase its margin of leadership and operate at a profit."

▶**Braniff Profit**—Braniff Airways discloses a net profit of $191,634 in its 1948 annual report. This compares with an adjusted net loss of $516,468 for 1947. The improved showing for 1948 was largely attributable to an increase in mail pay. Total mail compensation for 1948 amounted to more than 11 percent of all operating revenues received.

The impact of higher mail pay on 1947 results is evident with the notation of the receipt of $1,185,959 of such added compensation applicable to that year.

On the heels of receiving an increase in its basic mail rate of 22 cents per plane mile on its domestic system, effective from Mar. 1, 1948, Braniff on Jan. 1, 1949, filed a request for another increase, this time to 30 cents per plane mile. Prior to these recent increases, the prevailing rate was equivalent to 4 cents per plane mile.

▶**Latin American Route**—Braniff's inauguration of its Latin American services during 1948 proved to be a costly operation. This service sustained a loss of $228,795 for 1948. A temporary international mail rate of 95 cents per plane mile presently prevails for the company. However, application is pending for a higher rate which the company hopes will convert the loss on this service into a profit. In addition, the company is carrying as a deferred charge on its balance sheet, subject to subsequent amortization, a total of $563,563 representing extension and development expenses on its South American routes.

A decided improvement in Braniff's working capital position took place during 1948. At the year-end, this amount stood at $3,651,859 compared with only $1,666,424 a year earlier. The company's sole indebtedness consisted of $5,241,219 in long-term bank loans, payable in equal quarterly installments during the next five years with the interest rate at only 2¼ percent.

▶**Expansion**—Braniff continues its attempt to expand. Important stress is attached by the management to pending applications covering an extension to the West Coast as well as routes reaching north of its present system. CAB is known to be discouraging further route expansion adding to the overduplication of the nation's airline network. Instead, equipment interchanges of a "desirable" nature are strongly espoused to provide through services where none may exist today.

In view of the many pending mail rate actions which touch every airline, all published 1948 annual reports have a tentative note. Until temporary rates are replaced by permanent determinations, results revealed thus far must remain subject to certain qualifications. This is added reason to expect a certain definiteness concerning results for air carriers who do not look to mail pay as their main source of support.

—Selig Altschul

OSTUCO AIRCRAFT TUBING

The Pirate, XF6U-1, made for the Navy by Chance Vought Div., United Aircraft Corp., is well named since it is a versatile fighter designed to outmaneuver and outperform its opposition. This single-place, jet-type fighter, for carrier (catapult) or land operations, is classed in the 575 mph. speed category, by the Navy.

Pirate on the prowl...

Whether emphasis is on speed and maneuverability, as in the *Pirate*, or on long range and load carrying capacity, you know that materials of maximum strength and minimum weight are essential to greatest progress in aircraft design and construction.

And the vast majority of U. S. plane builders are meeting such requirements with OSTUCO Aircraft Tubing. Inherent strength-without-weight advantages plus specialized forming and machining qualities make it the best material obtainable anywhere for fuselage frames, strut assemblies, engine mounts, hydraulic systems, rudder controls and other applications.

OSTUCO made the first "Chrome-Moly" ever produced for aircraft use and is one of the nation's largest suppliers of aircraft tubing today—widely recognized for precision craftsmanship and low percentage of rejects. Prompt deliveries can be assured from special alloy steel inventories and from a wide range of tube sizes carried on hand for engine, aircraft mechanical, and airframe tubing parts—all produced to Army, Navy, and AMS specifications. For fast service, contact your nearest OSTUCO Sales Office now.

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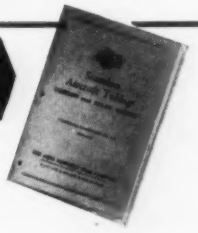

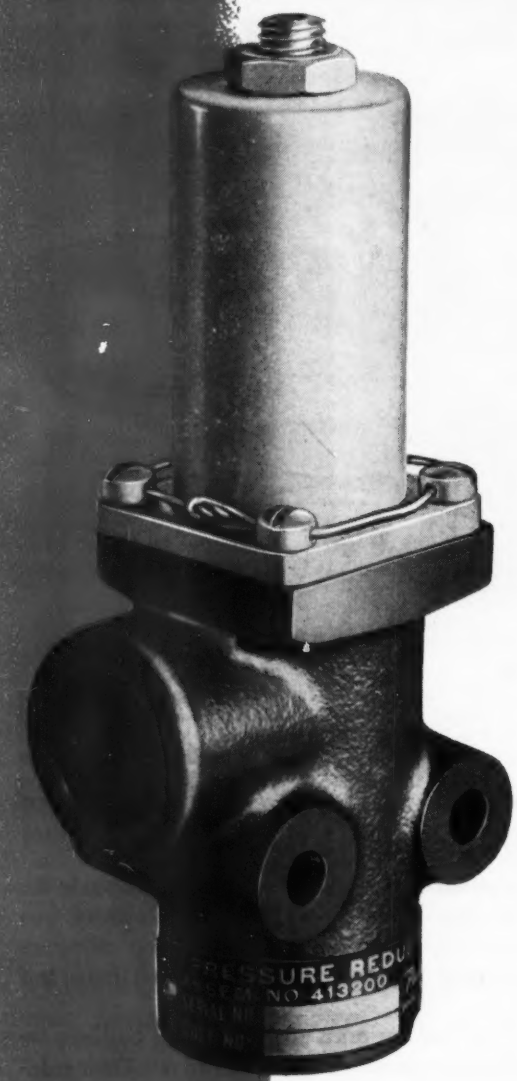

NEW

Bendix-Pacific

Hydraulic PRESSURE REDUCER

Simple... stable... light weight... quiet... low cost... these are important advantages of the new Bendix-Pacific Pressure Reducing Valves.

These new valves are direct acting and the outlet pressure can be adjusted through a wide range. They are available in ⅜", ½" and ¾" tube sizes for both 1500 and 3000 PSI inlet pressures with or without relief valves.

Bendix-Pacific Reducing Valves now in service have successfully met applicable AN qualification test requirements.

Write for further information on these Pressure Reducing Valves and other Bendix-Pacific Hydraulic Equipment.

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LETTERS

Lightplane Carburetion

I wish to congratulate Mr. Fred Weick on the compilation of information related in your article, March 7, on Powerplant Failure vs. Carburetion . . .

Through various tests, both in our laboratory and in flight, we at Bendix concur in general with the comments you have related in the article under the caption of "Carburetion Factor." However, we would like to register an objection as to the general use of the word "carburetor" in the reference article.

As you know, we are currently manufacturing a small injection type carburetor designated as our "PS Series." The PS model injection carburetor injects fuel into the intake manifold of the engine under pressure and at a point posterior to the carburetor throttles.

By introducing fuel at this point, the major icing hazard encountered from induction system icing, due to refrigeration effects on humid air, is eliminated inasmuch as fuel is injected and atomized at a point downstream of the throttles.

As you appreciate, in a typical float type carburetor the fuel enters the induction system anterior to the throttles, thereby allowing the fuel to impinge upon the throttles which in turn causes a lowering of temperature at this point due to the latent heat of evaporation of the fuel, and if this factor is present with humid air at 60 degrees F. or below, the possibilities of encountering ice accumulations on the throttle are probable.

It is assumed from the inference of the article that the fuel injection system you are recommending is port type fuel injection. We will concur with you in the fact that fuel injection either at the intake port or directly into the cylinder has many advantages, and certainly one which can be rightfully claimed is that of reducing the potential induction system icing hazard due to refrigeration effects. As you probably know, Bendix has been pioneers in the field of development of direct fuel injection. Our systems are in current use on many of the larger engines. We are currently working under a development contract with Wright Field for the development of a suitable injection system for small engines typical of those used in the personal aircraft industry.

As you probably know, there are no direct-to-port or direct-to-cylinder injection systems currently available which have satisfactory altitude and loan compensating characteristics.

I might also add that the problem of obtaining a good distribution with a direct-to-port injection system is not as simple as it may appear, due to the fact that the major portion of the engines with which you are dealing are naturally aspirated and you do not have the advantage of an impeller to more uniformly distribute the air to the various manifold branches.

Therefore, even though you may have fuel distribution to the various ports with a high degree of accuracy, the fuel air charge

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POSITIVE FLUX UNIFORMITY

Kester Flux-Core Solders are made with a single core in several core sizes ranging from an opening that contains ½ of 1% to 7% of flux by weight. These core sizes are available in each of 68 strand sizes. Use of the correct size assures you of absolute soldering control. Consult our Technical Department on any soldering problem.

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ADEL
TURBINE-TYPE WATER ALCOHOL PUMPS

Unexcelled for handling low viscosity fluids at relatively high pressures and low shaft speeds.

CORROSION RESISTANT CONSTRUCTION

NO METAL-TO-METAL CONTACT (EXCEPT BEARINGS)

CONTINUOUS OR INTERMITTENT DUTY

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EXCELLENT WET SUCTION CHARACTERISTICS

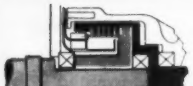
A COMPACT, LIGHTWEIGHT, HIGHLY-EFFICIENT, GENERAL PURPOSE WASH WATER PUMP—Capacity: 4-5 gpm at 10 psi at 28 volts D.C. Weight: 6.25 lbs. (with motor).

#16973

Typical turbine pump assembly.

AN ENGINE-DRIVEN WATER INJECTION PUMP WITH MAGNETIC CLUTCH AND ADJUSTABLE BYPASS VALVE—Capacity: 45 gpm at 55 psi at 3400 rpm [illegible] alcohol). Weight: 18.75 lbs.

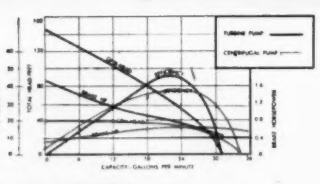
#20358



Schematic showing operation of solenoid-operated clutch.

A HIGH CAPACITY, LIGHTWEIGHT WATER INJECTION PUMP WITH ADJUSTABLE BYPASS VALVE—Available with or without 27 volt D.C. 4 hp motor. Capacity: 17-35 gpm at 45 psi at 3500 rpm. Weight: 5.0 lbs. (without motor).

#17976-2



Characteristic curves for centrifugal and turbine pumps.

ADEL

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CANADIAN REP. RAILWAY & POWER ENGINEERING CORPORATION, LIMITED

to the cylinder may be off a substantial amount.

In contrast, on a naturally aspirated engine where the fuel is introduced to the manifold at one central point and further, providing the manifold has no abrupt turns or protuberances that may cause centrifugal separation of the fuel from the air, it may be found easier to obtain more equal charge mixtures at the intake port by this method of fuel injection rather than at the individual take ports.

I am enclosing our Report 3795 covering some comparative icing tests which we ran for Wright Field on two Stinson Army 15B aircraft.

As you will note from the report, two airplanes were flown side by side through exactly the same type of climatic conditions. One of these airplanes had an injection type carburetor heretofore described. The other had a conventional float type carburetor. A number of instances of powerplant failure due to ice accumulations were encountered with the aircraft having the float type carburetor while under the same conditions the injection carburetor appeared to be completely satisfactory.

Approximately three years ago during the process of our developing and introducing the PS model carburetor to the industry, we gave CAA some data which demonstrated the non-icing ability of this particular carburetor configuration. As a result of this information, CAA approved the use of this carburetor without a preheat source. Of course, it is understood an alternate air source was available to assure continued performance in the event of air filter clogging due to impact icing conditions.

To sum up briefly, the chief objection we have to the comments on the above subject given in the reference article is that the word "carburetor" is not strictly defined to mean a fuel metering configuration which introduces fuel into the induction system anterior to the throttling valve or in other words, a float type carburetor. Further, it is felt that the injection type carburetor should have consideration as to a means of eliminating induction system icing hazard. It may be pointed out here for comparative information that the Ryan Navion (Army L-17) and Beech Bonanza currently use the PS-5C carburetor and there has been no report from any operator to date to the fact that induction system ice has been encountered.

We are planning to present a paper before the SAE National Aeronautical and Transport Meeting in New York on Apr. 13 which will give some of Bendix Stromberg's opinions on fuel system designs for personal aircraft. I am sure that we agree on one basic factor and that is that everything possible should be done to make the industry conscious of the induction system icing hazard and its limitations as regards design.

M. R. Balis, Sales Engineer
Aircraft Fuel Metering Section
Bendix Products Div., Bendix Aviation Corp.
South Bend 20, Ind.

Neglected Airship

If, as you aptly quote from the Secretary of Defense ". . . air power is the total air

resources of the United States," a reader interested in the whole field of aeronautics might wonder why your otherwise comprehensive "Inventory of U. S. Air Power" of Feb. 28 takes absolutely no notice whatsoever of airships. But, knowing first hand the wholly unrealistic way airships are administered in the Navy, I feel certain your omission of them stems from the failure of the Navy itself to mention airships in the information furnished you under either the broad "Projected Naval Air Program" or in even the system used for the designation of naval aircraft. . . .

Yet, believe it or not, in his Annual Report for the Fiscal 1948 the Secretary of the Navy lists under "Naval Aviation" eight "operational, fleet-combat" airships plus 15 others in shore establishments and Naval Air Reserve, as well as 62 other non-effectives in storage, etc. Furthermore, the Secretary of the Navy elsewhere in that same report says also:

"In July 1947, the Navy decided to continue its lighter-than-air organization, particularly for antisubmarine warfare. An extensive program of development has been inaugurated both for the airships themselves and for the necessary supporting equipment. . . ."

On top of that, but a few days ago Hanson Baldwin of the N. Y. Times reporting from the current naval maneuvers in the Caribbean mentions:

"Also, for the first time, two naval 'blimps' are an integral part of a 'hunter killer' group, and these two airships have used the restricted flight deck of the (carrier escort) Sicily as a combined 'mooring mast' and refueling station."

The presence of only two airships in the maneuvers strengthens my doubt as to the adequacy of our efforts to develop the type. But even just those two constitute *some* airships out there with the Fleet, and correctly or not they are operating with "Naval Aviation" despite denial to them of a place in the line-up of "Naval Aviation" except of course, whenever pruning season rolls around.

Well, who's right in this matter? Are Airships part of "Naval Aviation" as the Secretary of the Navy says? Or, are the boys who tally up "Naval Aviation" for the public's information correct in leaving them out?

Actually, this latest omission of mention of airships in the "Naval Aviation" roster again emphasizes the simple basic fact that the airship is not an airplane and strengthens my oft repeated contention that airship administration, development and progress should not be entrusted to airplane personnel who are not interested in airships and never seem to have time for anything but a negative and indifferent attitude towards them.

Airships should be yanked out of the apparently semi-autonomous "Naval Aviation" and integrated realistically into the Navy itself as the "displacement aircraft" type they really are. Present and past unrealistic handling of the airships is not a credit to "Naval Aviation," the Navy or to the country.

C. E. Rosendahl
Flag Point, Toms River, N. J.

Anti-Corrosive
STAINLESS STEEL FASTENINGS
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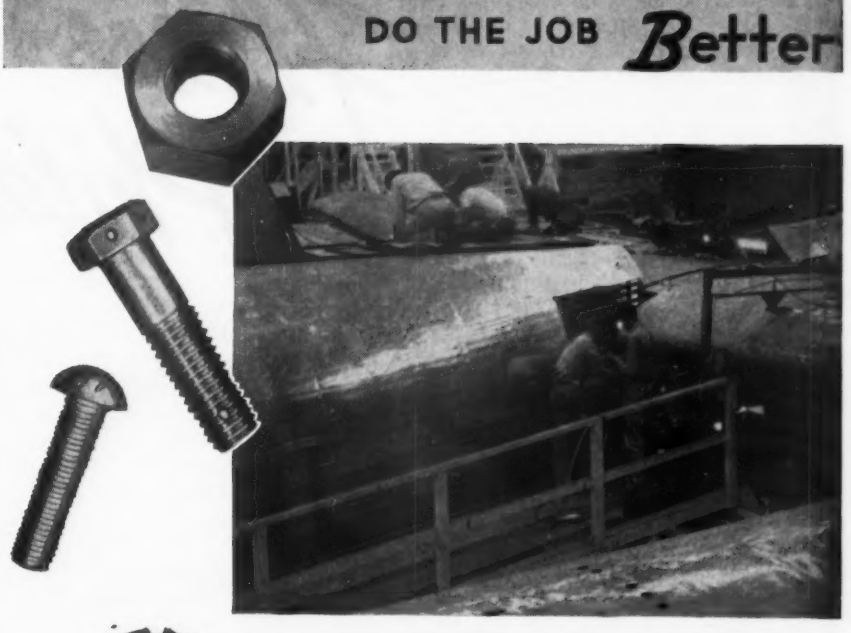

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Group Seeks Civil Flying Helps

CAA advisory committee seasons recommendations with suggestions for more understanding, less red tape.

Steps to relieve civil flying of some onerous regulatory burdens, and cushion some bumps on its current rocky road, have been recommended by the revitalized CAA Nonscheduled Flying Advisory Committee to Administrator Delos W. Rentzel.

Recommendations which were developed in a recent Washington session of the CAA, committee, headed by Don Flower, Cessna Aircraft Co. sales manager, include:

• **Deferment** of the proposed tightening up of CAA Manual 50 regulating aviation schools, and applying rules of the old Manual 50 with understanding and consideration for the operator during the present rough going for aviation training.

• **CAA approval** of the four-place plane training curriculum for private pilot instruction outlined by C. E. A. Brown, Ohio aeronautics director (AVIATION WEEK, Dec. 6, 1948) as a means of providing more economical and more interesting aeronautical training for student pilots.

• **Action** by CAA to relieve plane manufacturers of a large part of the engineering red tape incidental to certification of new aircraft and equipment. One suggestion in discussion was to limit requirements to flight tests using accelerometers to demonstrate that the planes could pass prescribed minimums. Another proposal called for a 50 hr. service test. It was recalled that CAA two years ago had offered to inspect and certify manufacturers as capable and give those qualified the responsibility for certification of their own planes but that the offer had not been accepted.

• **Amendment** of taxi plane operating regulations to permit single engine planes to perform limited instrument operations, (taking off under instrument conditions when their destination was in contact weather condition.)

• **Broadening** present requirements to authorize private pilots to use their planes for aerial seeding, spraying etc. on their own farms, and to perform any other plane operations for their own purposes, which did not entail being paid direct piloting compensation.

• **Annual requirements** for rejustification by military services and others of the danger area reservations shown on CAA charts. It was pointed out that a number of such areas continue to be shown on maps as restricted, after the need for this had past.

• **Expediting** development of charts locating omni-range stations for use with the newly developed omni-range radio equipment for small airplanes.

• **Additional attention** to problem of obtaining more accurate weather information for the private pilot who needs it for trips.

Discussion of stall warning indicators disclosed the fact that indicators are now being provided as standard equipment on a majority of the new planes currently produced and that other manufacturers are expected to provide the indicators in the near future.

J. B. Hartranft, Jr., general manager of AOPA, reported that experience of approximately 3000 AOPA member-owned planes equipped with stall warning devices has been free from spin-stall accidents.

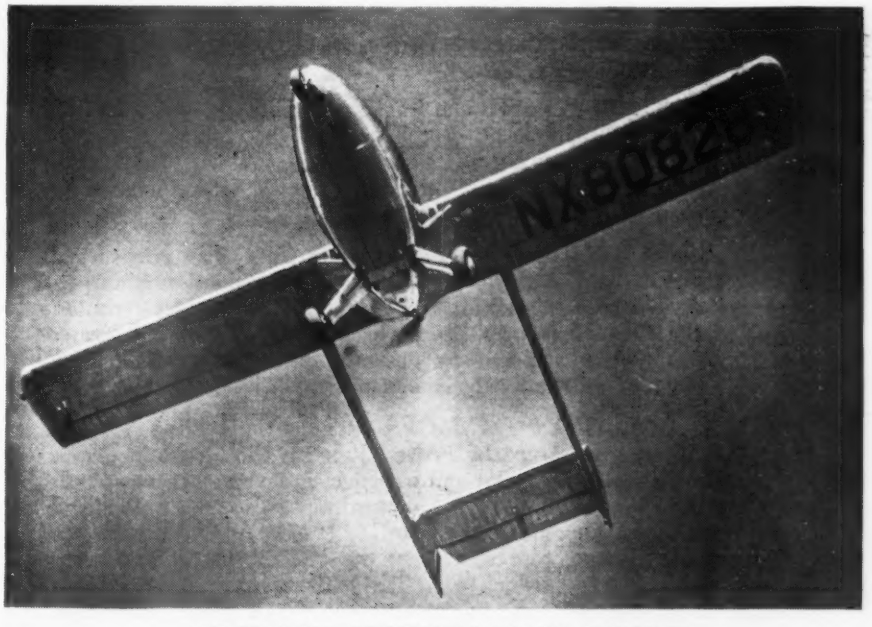
Members discussed proposed changes in name of the organization with two alternatives: Civil Aviation Advisory Board or Personal Flying Advisory Board. Change in name however will not mean a chance in status of the group, which will continue to be selected from private pilots, manufacturers, fixed base operators, and consumer aviation groups, to recommend "grass root" reactions to aviation development and regulation by Administrator Rentzel. H. Lloyd Child, assistant to the administrator for personal flying development, continues as secretary of the committee.

State License

Chief of four pieces of aviation legislation passed by the Washington state legislature is one which takes all privately-owned and fixed-base operation airplanes off local property tax lists and provides that planes be licensed by the state, on payment of fees according to a standard scale, beginning during next year.

Each plane will be issued a form of license tag—either a decal or a metal plate. The Washington State Aviation Assn., fixed-base operators' group, sought the new legislation because of "recurrent over-valuation of our aircraft by county assessors who had little or no knowledge of the aviation business," according to Robert N. Ward, executive secretary.

The new law provides for a yearly



ANDERSON GREENWOOD IN FLIGHT

First flight picture of the all-metal personal plane prototype developed by Anderson Greenwood & Co., Houston, Texas, shows streamlined fuselage, the straight full cantilever wing, and fixed tricycle landing gear. Designated Model AG-14, the two-place pusher has Continental 90 hp. engine and has flown over 230 hr. First production airplane will be built this spring for CAA certification tests. Static tests are reported about 80 percent completed and approved. (Aviation Week, Dec. 13, 1947)

BRIEFING FOR DEALERS & DISTRIBUTORS

CESSNA VS. PIPER—Rivalry between the two top personal plane producers, Cessna and Piper, continued warm in March, with Cessna producing 121 planes and Piper 115, according to unofficial preliminary figures gathered by Personal Aircraft Council of AIA.

Cessna Model 170 and Piper PA-16 Clipper were the two best sellers of the month with 85 of the Cessna four-placers and 46 of the Clippers reported shipped. Of 368 planes shipped by the seven companies reporting thus far, 262 were four-place. Aeronca continued in third place with 40 shipments including 24 Sedans.

AERIAL SPRAYING CONFERENCE—National Flying Farmers Assn. has called a national planning conference for development of aerial spraying, seeding and dusting at Kansas City Municipal Auditorium, Apr. 21 and 22. Secretary of Agriculture Brennan and CAA Administrator Del Rentzel are expected to head a Federal delegation.

Other groups from state agricultural agencies, state aviation boards, aircraft manufacturers, chemical industry, research organizations, farm owners, and aircraft service operators, will attend.

Policy-forming session will consider: standardized short courses for dusters and sprayers in all states, study of presently available aircraft and equipment for application, minimum requirements for operators to insure protection of consumers; self-regulation measures which will eliminate need for restrictive state and Federal regulations now being contemplated and possible formation of a continuing research foundation.

It is expected that a number of manufacturers will use the conference as a center for demonstration of aircraft chemicals and equipment for spraying, seeding, and dusting. Kansas City Municipal and Fairfax airports are providing free tie-down service to planes flying in for the conference if pilots bring their own tiedowns.

CLIPPER-COUPE COMPARISON—Piper Aircraft Corp., in a smart merchandising move, has prepared a comparison between its 1949 four-place Clipper at $2995 and the two-place Piper Coupe of 10 years ago, which sold at $1995. That $1995 price would mean $3546 on a basis of today's 56 cent valuation of the dollar, or the Clipper price would be only $1679 on a basis of the old dollar of 10 years ago.

So at a lower price with such an evaluation, the Clipper provides two more seats, 65 more hp., 35 mph. more cruising speed (110/75) and 205 miles more maximum range (480/275), than its predecessor the Coupe of 10 years ago, plus starter, generator and muffler, now, but not then, standard equipment.

BRIGHT NOTES—Bendix Radio Flightweight line showed a 25 percent increase in February 1949, over February 1948, following a comparable increase of 50 percent in January, 1947 sales . . . Edo Corp. sold 29 pairs of floats in January and February 1949, as compared to only 10 pairs in the first two months of 1948.

NEW BELL HELICOPTER—Bell Aircraft Corp. has price-tagged a new version of the 47-D helicopter at $23,500, a reduction from previous models which have sold for $39,500 and $25,000. New copter, designated the 47D-1, has a 500 lb. payload ,almost 40 percent greater than previous models, achieved by design improvements which have resulted in reduction of the weight empty to 1360 lb.

MIDAIR COLLISION DAMAGES—Judgments totalling approximately $20,000 were awarded by Federal Judge E. B. Freed, in Cleveland, for the air deaths of a pilot and passenger in an Aeronca two-placer which was in collision with a USAF Northrop P-61 "Black Widow" night fighter, near Wauseon, Ohio, July 18, 1947.

The precedent-setting case was under the Federal Tort Claims Act, effective Aug. 16, 1946, which permitted citizens to sue the Federal government for the first time in personal injury and death cases without Congressional sanction.

Verdict held crash was caused by failure of the USAF pilot to keep a proper lookout and observe Civil Air Regulations, as the P-61 crossed an airway on automatic pilot. Case will be an important precedent for damage cases in other mid-air collisions. It has not yet been determined whether it will be appealed. —ALEXANDER McSURELY

registration fee of $2, plus an excise tax of 1 percent of the fair market value of the aircraft.

Other legislation permits county airport districts to include all incorporated cities and towns in the district, provides for compliance bond by all aviation gasoline dealers and allows accumulation of funds by jointly-operated municipal airports.

Public Relations

A guide to improved public relations for the fixed base operator, published by the Personal Aircraft Council of AIA, is being distributed to operators throughout the country through the member manufacturing companies and through the council directly. Prepared by Don Ryan Mockler, public relations executive for the PAC, the 12-page booklet has endorsement of Aeronautical Training Society and NATA. It describes simple steps necessary to develop new business by establishing and maintaining close contacts with local civic groups, public officials, press, radio, etc. and by keeping facilities attractive and comfortable.

A specimen suggestion: "Never make a trip with an empty plane seat—invite some logical prospect to go with you. The public needs to learn the actual feel of flight."

Radio Endurance

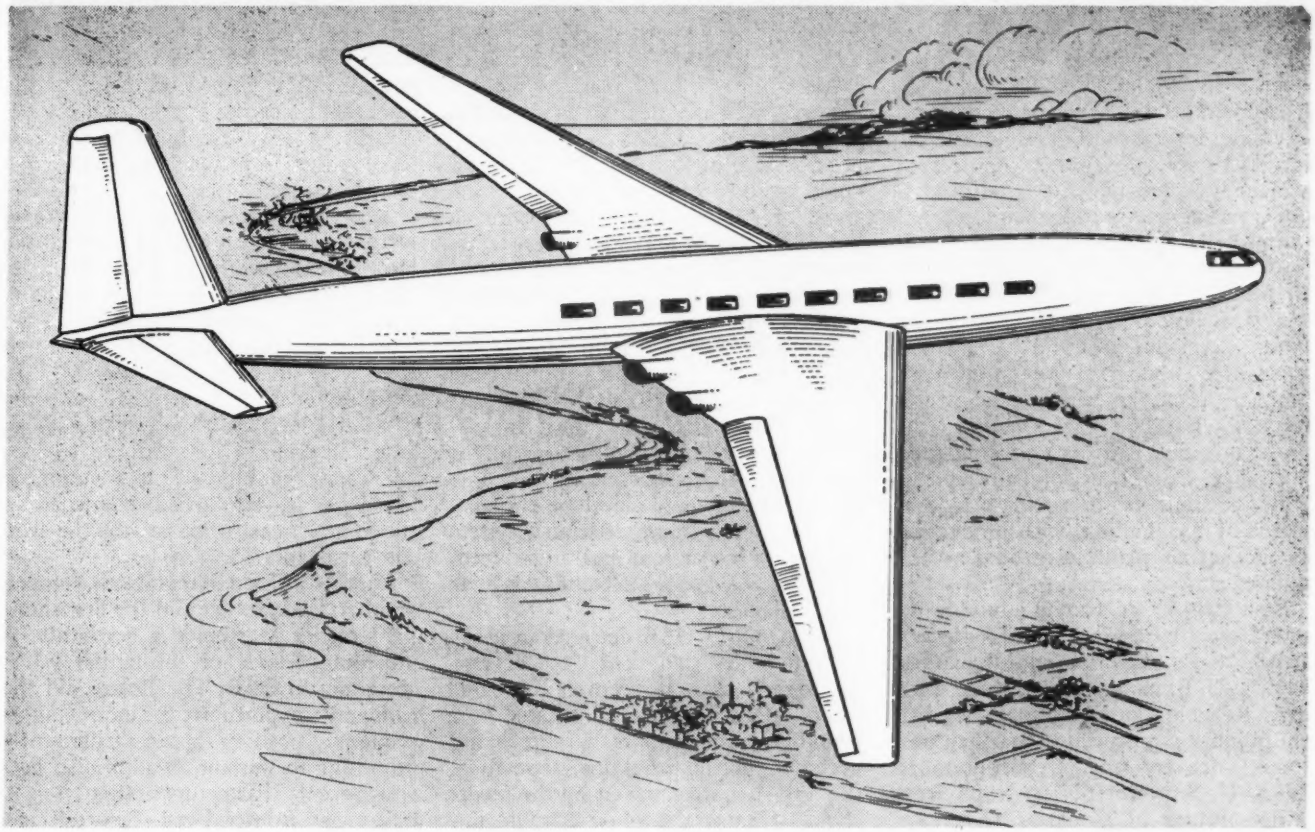
An endurance test on an RCA 116 Transceiver for personal planes, started in the Longview, Tex., endurance flight of "Miss Texas," a Luscombe sedan, is being continued by RCA in its own plane at Camden.

J. M. Hertzberg, aviation radio sales manager, reports that the Transceiver, after 533 consecutive flight hours in the endurance flight plane was checked and found in good condition, and was reinstalled in RCA's Beech Bonanza for further life testing. It was estimated at time of reinstallation that the radio equipment was in condition to operate for another 500 hr. or more without difficulty.

'49 Monocoupes

Monocoupe Aircraft & Engine Corp., Melbourne, Fla., has announced a 1949 line of three two-placers, all variations of the basic Monocoupe high-wing model. All are reported highly stressed for acrobatics, and the line includes a 115 hp. standard version, a 115 hp. deluxe version and a 185 hp. clip-wing plane with span of only 23 ft. 2½ in. as compared to the full span of 32 ft.

Flyaway prices of $3890 and $4490 are listed for the two 115 hp. Lycoming engine models. No price is quoted for the clip-wing version which uses a 185 hp. Warner Super Scarab engine.



The Comet—de Havilland's entry in the jet transport sweepstakes.

Views Vary on Jet Transports

Short haul concept favored in U. S., while British planners lean to long-range, trans-Atlantic craft.

Cleavage between British and United States views on development of commercial jet-powered airliners is become evident.

British are concentrating on a four-engine jet transport designed primarily for trans-oceanic and long-haul routes while U. S. manufacturers are pushing toward a twin-engine jet airliner designed for operation over short hauls between large cities. Both agree on an operational speed of 500 mph.

▶**De Havilland Comet**—Currently the most significant entry in the jet transport sweepstakes is the de Havilland Comet (DH106)—shown above—which is expected to make its first test flight before the end of this year and come into airline operation in 1952.

The Comet is a low, swept-wing monoplane powered by four de Havilland Ghost turbojets rated at 5000 lb. static thrust. It is expected to have a cruising speed of about 500 mph. It will carry a crew of four and up to 36 passengers over a range of about 2400 miles (London to New York nonstop in six hours). Cabin is pressurized and cruising is planned for 40,000 ft. for maximum economy or turbojet operations. An unusually large quantity of fuel will be carried and serviced through an under wing pressure refueling system.

▶**Building 16 Comets**—De Havilland is now working on a production program of 16 Comets at its Hatfield plant. Production of the Comet is proceeding directly from design with no pause for experimental prototype testing. British Overseas Airways Corp. and British South American Airways (soon to merge) will get 14 Comets, with the other two going to the Ministry of Supply.

In contrast to the concept of the Comet, two veteran U. S. transport manufacturers, Lockheed and Douglas, are aiming at a twin-jet inter-city express airliner for 500 mph. service over 400-880 mile distances. Theory behind this design is that it will be more economic because of lower operational costs and will tap heavier traffic density on the short-haul "commuter" runs than on the long-range luxury runs.

▶**Seek Demand**—U. S. manufacturers have been soliciting airlines for some time regarding their specific requirements for a jet transport and believe there will be a bigger demand for the short-haul jet than for a long range speedster. At least one airline, United, has postponed purchase of a replacement for its twin-engine DC-3s, because of the possibility of developing a short-haul jet airliner.

Boeing, the only other U. S. manufacturer currently in the jet transport development picture, is trying to get a good commercial design from its swept-wing Stratojet bomber.

The Boeing design would have four turbojets underslung in the manner of the B-47 and cruise at 400 mph. A B-47 recently made a transcontinental record of 3 hr. 46 min.

▶**C-102 a Compromise**—Canadian entry in the jet transport field, the Avro C-102, is a compromise between British and U. S. concepts. It is designed for short-haul inter-city operations but is powered by four Rolls-Royce Derwent turbojets and is likely to run into the uneconomical fuel consumption prob-

lems U. S. manufacturers are trying to avoid.

Biggest problem in getting U. S. jet transport designs off the drawing boards into the plants is money. None of the privately-financed postwar transport projects has yet hit the breakeven point although sales are virtually finished, and some firms took staggering losses. U. S. manufacturers are reluctant to get serious about jet transport development unless there is a reasonable prospect of somebody, probably the government, underwriting the developmental costs.

▶ **Prototype Bill**—Big hope along this line was the so-called prototype bill introduced in Congress by Sen. Ed Johnson (D., Colo.). However, the prototype development and evaluation committee appointed to study this problem came up with specifications for a jet transport that falls into the long-haul class with a 2400-mile nonstop range. Cost of developing two prototypes of this jet transport was estimated at $33 million, with production of another six planes estimated at $21 million.

The British are banking heavily on their Comet to regain the lead for luxury transports in the international market, held by U. S. manufacturers since war's end. Reliable sources report the British are promising prospective Brazilian customers delivery on jet transports in 1952. U. S. prototype legislation faces a dim future in Congress (AVIATION WEEK, Mar. 21), and any jet transport development now seems certain to lag far behind both British and Canadian projects.

Feeder Routes Aided In CAB Proposals

Termination of operating rights for one feederline and five-year certificate extensions for two others were proposed by the Civil Aeronautics Board last week as part of its overall plan to build a stronger network of short-haul routes.

Trans-Texas Airways, which inaugurated service in October, 1947, was ordered to show cause why its certificate should not be permitted to expire on May 13, 1950. On the other hand, Pioneer Air Lines and Southwest Airways were offered renewal of franchises which are now due to run out.

▶ **Self-Sufficiency Not in Sight**—In making its proposals (on which formal hearings will be held) CAB asserted that none of the feeders has shown promise of commercial self-sufficiency. But the Board said that in aggregate the lines have contributed to development of a domestic air transportation system adapted to the present and future needs of commerce, the postal service and national defense.

"Generally," CAB declared in a significant policy statement, "feeder service should not be competitive, and where a feeder route is duplicated by a trunkline carrier and such route is not necessary to the trunkline's operation, the link should be served by the feeder alone. Conversely, where a route is a necessary and integral part of a trunkline system, and economically essential, then such a route should not be served by a feeder."

▶ **Commercial Revenues Low**—CAB said that Trans-Texas' non-mail revenues have been extremely low in relation to its operating costs and that its dependence on government subsidy has been correspondingly great. "It appears to us," the Board continued, "that the cost of Trans-Texas' operations to the government is disproportionate to the value of the carrier's service, and there is little, if any, likelihood of any material reduction in such cost as the foreseeable future."

Last year, Trans-Texas' DC-3 load factors averaged only 13.64 percent, the lowest in the industry. From Oct. 11, 1947, through last December, the company's total commercial revenues (including passenger income) aggregated $288,839, while expenses were $1,753,237, leaving a break-even mail pay need of $1,464,398. Without making allowance for profit, CAB said the feeder's operations would cost the government $1.48 per person carried, compared to the $11.77 ticket price paid by the average passenger.

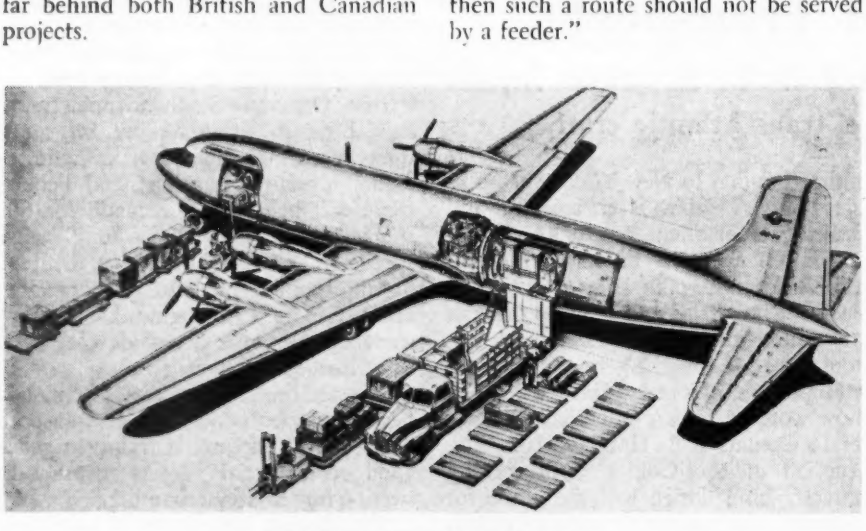
▶ **Further Experimentation**—Pioneer, another Texas feeder and the first short-haul carrier to receive a certificate, is providing service of substantial value, according to CAB. The Board said the company's opportunity for improving its economic position appears sufficiently promising to warrant an additional five-year period of experimentation.

▶ **Stronger Routes Eyed**—Pioneer's revenue ton-mile operating costs have been less than those of any other short-haul carrier, and the company "is among the most successful of our feeders," CAB declared. Nevertheless, the Board proposed several moves to strengthen Pioneer's route structure, including the transfer to PAL of two of Trans-Texas' more productive segments: Dallas-San Angelo and Dallas-Houston.

CAB will also determine whether Braniff Airways' authority to serve Waco and Lubbock, Tex., American Airlines' authority to serve Midland-Odessa and Continental Air Lines' Authority to serve Big Spring should be suspended for five years to relieve Pioneer of unnecessary and uneconomic competition.

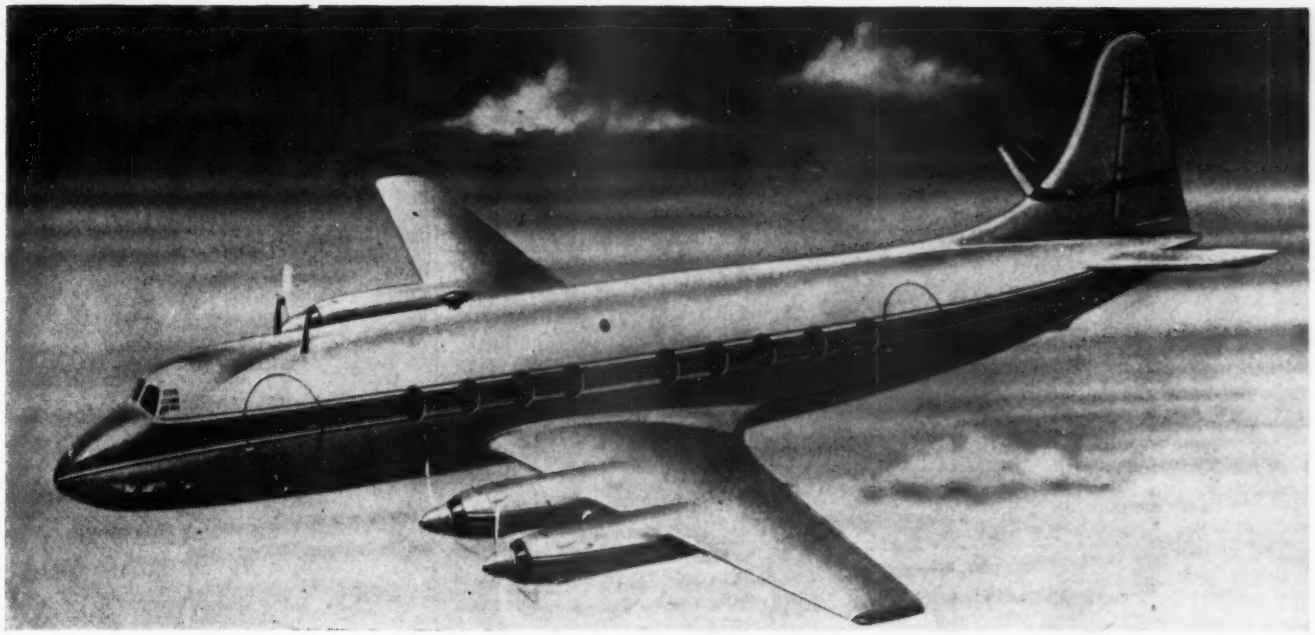
▶ **SWA Shows Progress**—Turning to Southwest Airways, CAB found that this carrier also is providing valuable service and has a sufficiently favorable outlook for improvement to justify a certificate extension.

CAB proposes to strengthen Southwest's operations in the future by suspending for five years the competing service now provided by United Air Lines at Eureka, Red Bluff, Monterey and Santa Barbara, Calif. The Board said UAL's service to these points appears unprofitable; thus both United and Southwest would benefit from the change.



DEBUT DUE FOR DC-6A

Now under construction at Douglas Aircraft Co.'s Santa Monica, Calif., plant, the first DC-6A freighter is slated to make initial flights this summer. Pressurized craft, which represents a several million dollar investment by Douglas, has been given considerable study by all-cargo carriers, by the regular airlines, and by the military. Specifications conform closely with those listed by prototype group of the Civil Transport Aircraft Evaluation and Development Board as being most desirable for a long-haul freighter capable of doubling as an auxiliary military transport during emergency. Selling for an estimated $1 million, DC-6A is designed to carry a 15-ton payload 2000 miles at 300 mph. cruising speed with direct operating costs of around 4.5 cents a ton mile. Landing and takeoff distance requirements for the DC-6A are somewhat higher than 4000 ft. maximum envisioned by the prototype group.



New Modifications for Viscount

Vickers-Armstrong increases performance, payload and power to revive airline interest in turboprop craft.

(*McGraw-Hill World News*)

LONDON—The Viscount project may be revived despite the fact that British European Airways turned the aircraft down in favor of the Airspeed Ambassador even before the Viscount made its first flight.

Modifications to Vickers-Armstrongs' Viscount, world's first turboprop airliner, will give it increased power, greater payload and improved performance in the air. The new version has been designated Viscount 700, to distinguish it from the prototype.

No forecast of when the first Viscount 700 will fly is available. While a number of airline operators have displayed interest in the Viscount and have been given numerous demonstration flights in the prototype, there have been no firm orders announced.

Viscount is extremely free of vibration and noise, both when the turboprops are being run up, on the ground, and while the plane is in the air. This characteristic of the Viscount has been clearly established by numerous demonstrations that pencils and coins, stood on edge on one of the cabin tables, will remain standing for many minutes while the plane is in flight, and usually have to be pushed over.

This lack of vibration will certainly mean less fatigue for the crew and a new standard of comfort for passengers. Most of the credit, is due to the turboprop engines (four Rolls-Royce Darts), but Vickers-Armstrongs has also done a good job of sound-proofing the cabin against the high-pitched whine of the turbines. Some reduction in airframe maintenance (with consequent savings in cost) is also to be expected from the use of turboprop engines, compared to that in piston-engined planes.

Viscount 700 is designed to take advantage of the increased power made available by the incorporation of the new Rolls-Royce Dart, the RDa.3, developing 1420 shp. Fuselage has been lengthened nearly 7 ft. to permit an increase in passenger-accommodation from the prototype's 32 normal and 43 maximum. Production series will have 40-passenger and 53-passenger versions. Wing span has also been increased by 5 ft., to 94 ft., to give better performance without affecting the handling characteristics of the prototype.

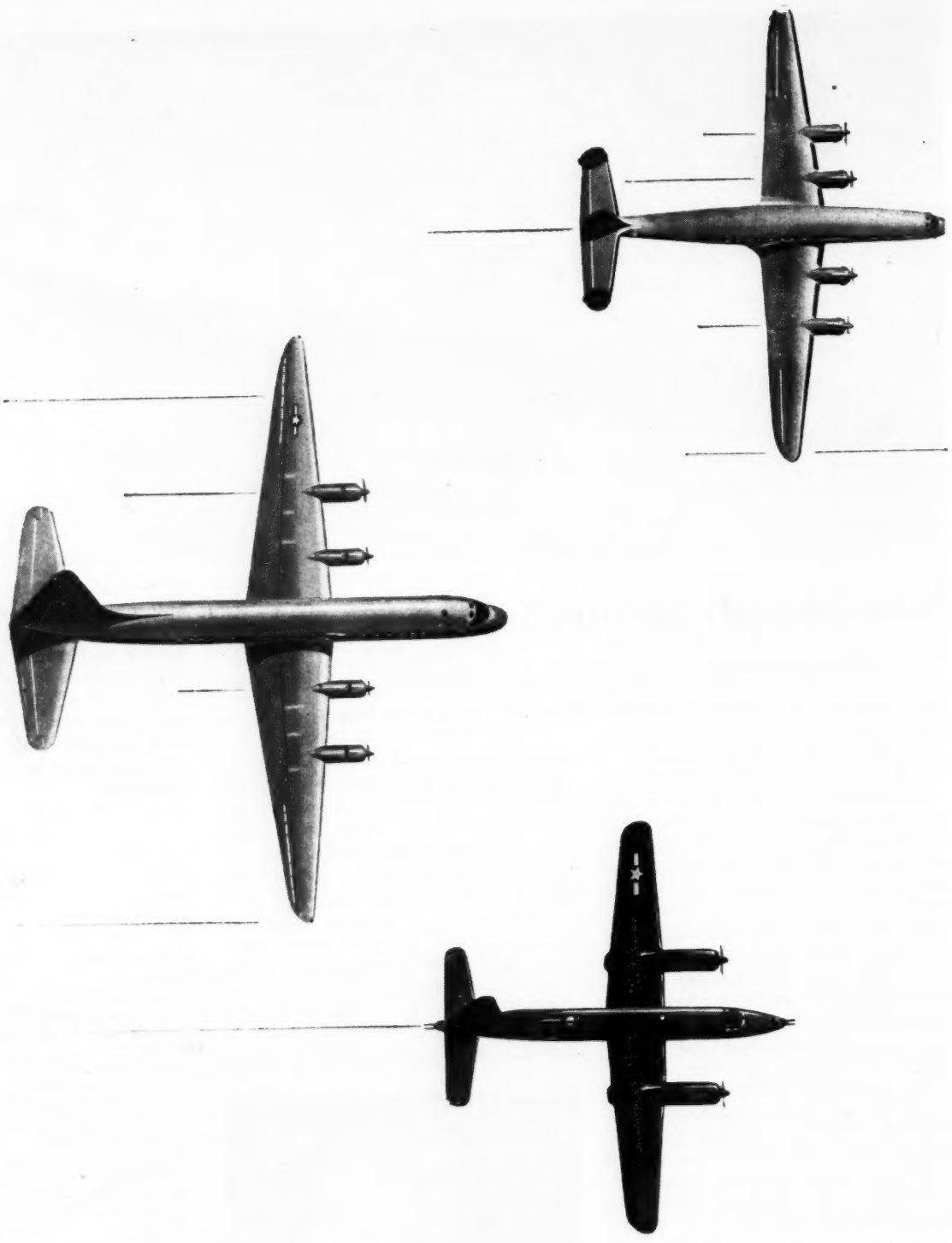
General data in comparison with the prototype:

	Viscount 700	Prototype
Span	94 ft.	89 ft.
Length	81 ft. 2 in.	74 ft. 6 in.
Height	26 ft. 9 in.	26 ft. 9 in.
Max. takeoff weight	48,000 lb.	45,000 lb.
Max. landing weight	45,500 lb.	42,500 lb.
Wing area (gross)	963 sq. ft.	885 sq. ft.
Fuel capacity	1400 gallons	1200 gal.
Cruising speed at max. takeoff weight on 68 percent engine power at 20,000 ft.	274 knots (315 m.p.h.)	280 knots
Cruising speed at 85 percent takeoff weight on 68 percent engine power at 25,000 ft.	283 knots (327.5 m.p.h.)	290 knots
Takeoff distance to clear 50 ft., max. takeoff weight	1,146 yd.	1,030 yd.
3 engine takeoff to clear 50 ft., max. takeoff weight	1,375 yd.	1,300 yd.
Landing distance from 50 ft. at max. landing weight in still air	900 yd.	900 yd.
Service ceiling at max. takeoff weight:		
a) all engines operating	30,000 ft.	32,500 ft.
b) one engine inoperative	23,000 ft.	26,000 ft.

Coins and pencils stand on end during a test flight of the Vickers-Armstrong Viscount, turboprop-powered airliner, while Lord Kershaw, a director of British South American Airways observes. Passengers on Viscount test flights confirm company claims that the new airliner is virtually free of vibration and offers a new standard of passenger comfort.

NEA Convair-Liners

Northeast Airlines expects to begin Convair-Liner service about May 15. Carrier took delivery on first of its new 40-passenger transports in February. Other four planes are expected by late April.



All the Leaders are Lockheeds

All current Lockheed planes have set official world records.

The Lockheed Constitution has carried more people farther—nonstop—than any other operational transport (90 persons 2,557 miles).

The Lockheed F-80 Shooting Star set the world's official speed record for crossing the continental United States (2,445 miles in 4 hours, 13 minutes).

The Lockheed Constellation broke the official transport speed record—after four years of commercial service—by crossing the United States in 377 minutes.

The Lockheed P2V Neptune has flown a greater distance nonstop without refueling than any other plane in the world (11,236 miles—from Perth, Australia, to Columbus, Ohio).

Lockheed

AIRCRAFT CORP., BURBANK, CALIF

Look to Lockheed for Leadership

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Rebound

Airline annual reports show great traffic and financial gains in 1948.

The air transport industry's financial and traffic rebounds from 1948 low points stick out in recently-issued year-end reports.

Some of the most impressive gains have been disclosed by American Airlines, which made a sharp comeback during the last three quarters of 1948 and continued to show progress in the first quarter of 1949. Year-end reports of TWA and Western Air Lines also reflect management optimism for a profitable future.

▶ **Revenues Set Record**—American's revenues last year hit an all-time peak of $89,286,000, up more than 9 percent over 1947; and passengers carried (2,817,000) also set a new record. Net loss of $2,894,000 in 1948 compared with an adjusted deficit of $3,401,000 for 1947.

Results for 1948 do not reflect revenues from CAB's award of $2 million as partial reimbursement for losses incurred when DC-6s were grounded during the latter part of 1947 and early 1948. This money is payable at the rate of $33,333 monthly over a five-year period beginning last June 1.

▶ **Profits for Nine Months**—American suffered a loss of $4,285,000 in first quarter 1948 when it operated without the services of its DC-6s. During the last three quarters company showed a profit. December, 1948, earnings of $148,000 represented first December profit since 1944.

President C. R. Smith said there are already indications that 1949 will be a profitable year and one in which American will increase its margin of traffic leadership. AA's revenue passenger mileage during the first two months of 1949 was 37 percent higher than in the same 1948 period and 16 percent higher than in January-February, 1947.

▶ **Safety and Economy**—An unparalleled safety record and system-wide economies have figured importantly in American's improved position. On Mar. 3, 1949, the company completed its third year without a passenger fatality.

Break-even passenger load factor, which declined from 82 percent in 1946 to 74 percent in 1947, skidded to 57 percent in the last half of 1948. Operating expense per available ton mile flown dropped from 31.2 cents in 1947 to 27.3 cents in the last six months of 1948.

American's mail volume increased 17 percent to 8,210,000 ton miles in 1948. Scheduled cargo traffic (express and freight) rose over 60 percent to 28,735,000 ton miles in 1948.

▶ **Flight Engineer Expense**—A whopping 42 percent increase in gasoline and oil expense was recorded last year, but prices of these items are expected to level off. Payroll costs, however, will be higher in 1949 due to salary and wage increases. Addition of flight engineers on DC-6s, a move American opposed, will alone cost $1 million annually.

AA expects no general increase in passenger fares this year. Company officials say there may be opportunities for future rate reductions if prices stabilize and projected economies are realized through use of more efficient equipment.

▶ **TWA Cuts Losses**—Meanwhile, TWA reports it had cut its combined domestic and overseas net loss to $478,987 last year, compared with a deficit of $8,079,761 in 1947 and $13,666,000 in 1946. Carrier showed a $2,125,344 operating profit in 1948 before provision for losses on investments and other items.

President Ralph S. Damon states that prospects for future profits are much more favorable than a year ago and that major difficulties facing the industry and TWA are past. TWA's international division last year produced about 40 percent of company's gross revenue and showed a $656,000 net profit, but this was offset by a $1,135,000 deficit on domestic services.

TWA's gross revenues increased $22,274,000 to $101,114,000 last year, but costs were up $13,325,000. A 15 percent increase in traffic handled in 1948 over 1947 accounted for $6,420,000 of the higher gross revenue. Larger revenue also included $8,929,000 from higher air mail rates and $6,925,000 from increased passenger fares.

▶ **Profit for Western-Inland**—Western Air Lines (together with its Inland Air Lines subsidiary) earned a net profit of $134,704 in 1948, ocmpared to a $945,000 deficit for 1947. President T. C. Drinkwater states that with continued progress in cost reduction and appropriate adjustments in mail pay the company expects to operate at a profit during 1949.

WAL reduced its employes 50 percent from 2396 on Jan. 1, 1947, to 1203 on Mar. 1, 1949, cutting total payroll expense 34 percent. (During the same period the average salary rose 32 percent.) Total operating expense dropped 21 percent last year, but operating revenues also declined 15 percent as compared to 1947.

▶ **No-Meal Policy Promoted**—Drinkwater said WAL will continue a vigorous promotional campaign in connection with its no-meal policy (adopted Feb. 1) which permits a 5 percent basic fare reduction.

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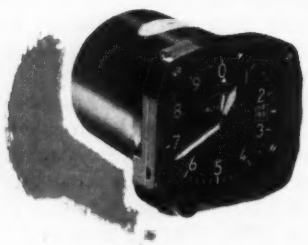

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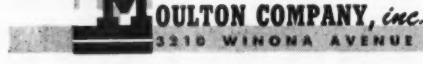

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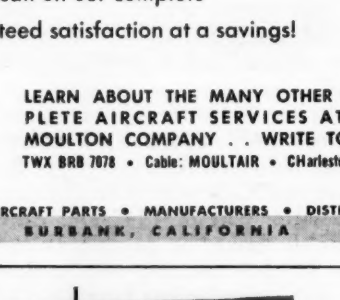

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AA Closes Ardmore

American Airlines has deactivated its Ardmore, Okla., training center where it has been giving instruction to employes handling its postwar fleet of DC-4s, DC-6s and Convair-Liners.

Since June, 1946, AA trained 4000 of its own students (2195 of them pilots) and 190 from other companies in the U. S., Sweden, Australia, Argentina, Venezuela, Brazil, Peru, Holland and China. In addition to pilots, flight engineers, ticket and cargo agents, mechanics, stewardesses and dispatchers received schooling at the center. Nobody was injured during the entire operation, according to American.

The center was an Air Force glider and heavy bombardment base during the war. Subsequently it was turned over to the city of Ardmore, which rented it to American.

Operating Deficit Cut

The 16 domestic trunklines during January of this year shaved their combined operating deficit to about $3,450,000, compared to $4,811,000 in the same 1948 month.

Four carriers had operating profits in January, 1949: Eastern Air Lines $580,000, National Airlines $154,000, Delta Air Lines $39,000 and Inland Air Lines $11,000. Biggest losses: United $1,301,000, TWA $815,000, Northwest $636,000 and Capital $450,000. In January, 1948, only Eastern was in the black, and American had the largest deficit, $1,832,000.

UAL On Television

United Air Lines is using spot television advertising in Los Angeles, Chicago, New York, San Francisco and Seattle. Commercials employ one-minute motion pictures of DC-6 operations.

Four Carriers Report Executive Salaries

Reports of four more airlines on executives' salaries during 1948 in general show small changes from 1947 levels.

United Air Lines disclosed that its president, W. A. Patterson, received $62,500 last year, compared to $59,375 in 1947. In addition, UAL contributed $5229 toward Patterson's retirement fund and group insurance plan, against $4759 the previous year.

Croil Hunter, Northwest Airlines president and general manager, received $45,000 in 1948, the same as in 1947. Carleton Putnam, board chairman of Chicago & Southern Air Lines, was paid $26,000 in both years; while

George E. Gardner, Northeast Airlines president, received $16,850 in 1948 against $10,000 in 1947.

Other executives' 1948 compensation, with 1947 figure in parentheses:

▶ **United**—Harold Crary, vice president-traffic, $18,500 plus $2602 for retirement and group insurance ($18,500 plus $2475); J. A. Herlihy, vice president-operations, $35,000 plus $2417 ($35,000 plus $2315); R. W. Ireland, vice president-administration, $30,000 plus $3389 ($30,000 plus $4370); Hal W. Nourse, vice president-economic controls, $17,500 plus $1337 ($17,500 plus $1285); R. F. Ahrens, vice president-personnel, $17,416 plus $1219 ($16,500 plus $1105); D. F. Magarrell, vice president-passenger service, $17,416 plus $1066 ($16,500 plus $970); S. P. Martin, secretary, $11,958 plus $743 ($11,500 plus $687); N. B. Haley, treasurer, $13,000 plus $1966 ($13,000 plus $1870); C. H. Blanchar, comptroller, $10,549 plus $475 ($10,000 plus $435).

▶ **Northwest**—L. C. Glotzbach, vice president and assistant to president, $17,000 ($17,000); E. I. Whyatt, executive vice president, $20,000 ($20,000); A. E. Floan, vice president and secretary, $17,000 ($17,000); K. R. Ferguson, vice president engineering and planning, $18,000 ($18,000); W. F. Marshall, vice president-operations, $15,057 until resignation Sept. 15, 1948, ($18,000); R. O. Bullwinkel, vice president-traffic, $15,000 ($15,000); L. S. Holstad, treasurer, $15,000 ($15,000); F. C. Judd, western region vice president, $15,000 ($15,000); D. J. King, Orient region vice president, $15,850 ($16,258); Charles Stearns, assistant secretary, $9930 ($9100); W. J. Eiden, assistant treasurer, $10,800 ($10,150).

▶ **Chicago & Southern**—Sidney Stewart, president, $25,416 ($24,999); J. H. Cooper, vice president and treasurer, $15,250 ($15,000); R. S. Maurer, secretary and general counsel, $12,000 ($11,250); T. F. Hambleton, assistant treasurer, $6400 ($2562); Robert Scrivener, assistant treasurer, $5160 ($5100); Erma Murray, assistant secretary, $4680 ($4620).

▶ **Northeast**—Paul F. Collins, board chairman, $1250 ($6000); M. H. Anderson, vice president, $15,000 ($15,000); L. W. Miller, vice president and treasurer, $1500 ($7776); A. A. Lane, vice president, $2400; R. H. Herrnstein, assistant treasurer, $7500. As of Dec. 31, 1948, Atlas Corp. still held 19 percent of NEA's common stock and 95 percent of the preferred.

Hearing Suspended In National Probe

Civil Aeronautics Board investigation to determine whether National Airlines should be dismembered has shown signs of flying apart.

After three weeks of testimony, hearings were suddenly suspended on Mar. 30 when announcement was made of an equipment interchange and stock sale agreement which would (if CAB approves) give Pan American Airways and W. R. Grace & Co., virtual control of National (AVIATION WEEK, Apr. 4). In light of the National-PAA-Grace proposal, NAL's attorneys sought to have the dismemberment proceeding dismissed; but the examiner decided on an indefinite adjournment of hearings instead.

▶ **Satisfactory Solution Seen**—National

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now contends there is no need to continue the dismemberment probe since the interchange and stock sale arrangement offers a satisfactory solution to the problem being investigated by CAB. But other carriers which have participated in the case want the hearings continued on the ground that the interchange suggested is only one of many possible methods of readjusting National's operations.

During the first three weeks of testimony, National and other operators reiterated their belief that CAB has no power to order the transfer of NAL's routes and property against the company's will. Yet representatives of Pan American, Braniff Airways, Northeast Airlines, Colonial Airlines, Eastern Air Lines, Delta Air Lines, Capital Airlines and Chicago & Southern Air Lines all argued that their company's acquisition of part or all of NAL's system would best serve the public interest if the Board forces a dismemberment of the routes.

Nonsked Brings Suit Against Major Lines

A Concord, Calif., nonscheduled operator, S. S. W., Inc., has filed a $1.5 million suit against 12 certificated airlines, the Air Transport Assn. and the Air Traffic Conference of America, charging them with conspiracy and combination to restrain interstate air commerce in violation of the Sherman Anti-Trust Act.

The complaint alleges that the major airlines, "under the guise of experimental operation" have initiated a "pseudo coach fare service" for the purpose of injuring the plaintiff and other independent carriers and driving them out of business. The certificated airlines have in the past canceled cut rates after competition has been eliminated, S. E. Spicher, president of S. S. W., charged. He said the certificated carriers engaged in the same tactics to drive all-cargo operators out of business.

Filed in Washington, D. C., Federal court, the action also declares that the certificated airlines through advertisements, news releases and statements to clients, have sought to discredit the nonskeds' safety record; have coerced ticket agencies and travel bureaus from acting as agents for nonskeds; and have conspired to deny the nonskeds airport facilities. Airline defendants are American, American Overseas, Braniff, Capital, Colonial, Continental, Eastern, Northwest, Pan American, Panagra, TWA and United.

Artist's impression of HT-2: the first all-Indian airplane.

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Permit Renewed Despite PAA Protest

Civil Aeronautics Board has renewed foreign air carrier permit of TACA, S. A., despite the fact that the Salvadoran line is controlled by Waterman Steamship Corp., a U. S. surface operator.

Pan American Airways had strenuously opposed extension of the permit, charging that Waterman, through its control of TACA, was attempting to obtain by subterfuge routes the steamship line could not acquire by direct application.

According to Pan American, TACA was not entitled to U. S. routes on the basis of international reciprocity because it is not a bona fide Salvadoran company. (Waterman's own applications for Latin American routes has been turned down by CAB.)

► **Reciprocity Main Consideration**—The Board decided, however, that the requirements of reciprocity outweigh the factors created by Waterman's control of TACA. Consequently, with President Truman's approval, CAB not only extended TACA's permit for New Orleans-San Salvador, El Salvador, service into 1952 but added two new intermediate points to the link—Guatemala City, Guatemala, and Belize, British Honduras.

TACA's request for extension of its

San Salvador-Miami permit was denied. The carrier had suspended service over the Miami link early in 1948.

In pointing to the importance of reciprocity to the case, CAB noted that Pan American has been operating into El Salvador and most other Central American countries with permission of those nations. Besides, El Salvador, Guatemala, Nicaragua, Honduras, Costa Rica and British Honduras had requested favorable board action on TACA's application.

► **Policy Explained**—CAB cautioned that its decision should not be considered as fixing a policy of approving any application by a carrier controlled by a surface carrier. "Nor should the decision be considered as fixing a policy whereby a U. S. national, in effect, may obtain a permit indirectly by organizing a subsidiary or controlled corporation under the laws of a foreign country and then filing an application as a national of such foreign country."

The Board's decision to limit the permit to three years was made, in part, to cope with any situation adverse to the public interest which may arise from Waterman's control of TACA.

SHORTLINES

► **American**—Reports that 200, or 57 percent, of its captains have been flying more than ten years for the company and none has been employed less than eight years. Eighty percent of the first officers have flown with AA more than five years. Average flying time logged by American's captains is over 13,000 hr.; for first officers about 8000 hr.

► **Bahamas Airways**—Has inaugurated twice weekly service between West Palm Beach, Fla., and Nassau, Bahamas, using 21-place amphibians. Company is affiliate of British South American Airways.

► **Braniff**—Has reduced price of both upper and lower berths on Latin American flights to a cost basis. Charge per night for DC-6 upper berth on the Houston-Lima-Rio de Janeiro run is now $10, for lower berth, $20.

► **BOAC**—Has taken delivery on its first Canadair Four in England two months ahead of contract date. Second of the 22 Canadian-built planes ordered by BOAC already has been test flown in Montreal and is to be delivered in April. British South American Airways reportedly has ordered 19 Canadair Fours to replace Tudor IVs, now out of commercial service.

► **Canadian Pacific Air Lines**—Has joined the International Air Transport Assn. as an active member. Carrier

Non-stop 'Round-the-World Flight Made by U.S. Bomber in 94 Hours
(Pictures and map on Page 18.)
Fort Worth, Tex., March 2—(AP)—The United States Air Force has circled the globe non-stop for the first time.
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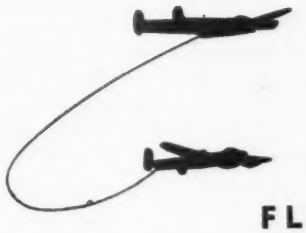

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plans to begin trans-Pacific service this summer.

▶ **Chicago & Southern**—Plans to spur warm-weather travel to Cuba, Jamaica and Venezuela with seven different all-expense air cruises starting Apr. 1.

▶ **Continental**—Joseph A. Uhl has been elected a vice-president. He will continue to hold the post of secretary-treasurer. . . . Company is issuing annual passes for free system-wide transportation to five-year employes and their wives.

▶ **Delta**—Reports $465,848 profit for eight months ended Feb. 28. Passenger traffic for first quarter 1949 was up about 25 percent over the same period last year. March was expected to be the best month in company history, with a $140,000 net profit anticipated.

▶ **Economy Airways**—The New York nonscheduled operator's request for a CAB exemption to conduct skycoach service transcontinentally, from New York to Miami, and from New York to Dallas has been denied.

▶ **Florida Airways**—Terminated feeder operations late last month as CAB refused to reconsider a decision not to extend the carrier's certificate.

▶ **Scandinavian Airlines System**—Has cut cargo rates to Europe and the Middle East from 11 to 30 percent.

▶ **TACA**—On May 15 will reduce by 25 percent summer vacation passenger fares from New Orleans to Central America.

▶ **TWA**—Has signed a contract with the International Assn. of Machinists boosting wages of about 3500 employes from 5 to 8 cents an hour retroactive to Jan. 1.

CAB SCHEDULE

Apr. 11—Hearing on Board's enforcement proceeding against Viking Airlines. (Docket 3447)

Apr. 15—Prehearing conference on Texas area route applications of Val-Air Lines and Trans-Texas Airways. (Docket 3645 and 3267)

Apr. 18—Hearing on Board's investigation of through service and interchange requirements at St. Louis and Memphis. (Docket 3426)

Apr. 20—Hearing on Chicago & Southern Air Lines' application to abandon service at Bloomington, Peoria and Springfield, Ill. (Docket 3571)

Apr. 21—Hearing on Scandinavian Airlines System's foreign air carrier permit amendment case. (Docket 3343 and 3680)

Apr. 25—Hearing on seasonal service to Lake Tahoe. (Docket 3623)

May 2—Hearing in reopened Hawaiian case. (Docket 851 et al)

May 2—Hearing on additional southern transcontinental service. (Docket 1102 et al)

May 9 or 16—Hearing in North Atlantic route transfer case. (Docket 3589 et al)

May 16—Hearing on Hughes Tool Co. control of TWA. (Docket 2796)

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STRICTLY PERSONAL

BITS ABOUT PEOPLE—Jim Strebig, aviation editor of Associated Press, has been seriously ill in Georgetown Hospital, Washington, D. C. Why don't you drop him a line? . . . **Vince Conroy,** 20 years in the airlines and former TWA vp, becomes vice president of John A. Cairns & Co. Inc., NYC. He has been president of **Sam Solomon's** Atlantic Airlines until recently . . . **Alex McSurely,** associate editor of AVIATION WEEK, may become a technical consultant for Warner Bros. for an aviation movie coming up in several months.

* * *

WEIR'S WEIRD SENSE OF HUMOR—Tide Magazine was fit to be tied at the clever bantering of one **Walter Weir** during a show at the annual dinner of the Federation of Railway Progress. It seems they put on a burlesque of one of these courtroom radio programs on the subject of "Air Travel or Rail Travel."

One of the witnesses for the railroads was the excruciatingly funny Mr. Weir who, according to Tide, "deported himself brilliantly, really doing his whole calling proud."

Well, you aviation people will be hilarious at Weir's wit. Read how Tide told about it:

"As one, quick example of his fast repartee, he was asked why he preferred rail to air travel.

" 'Out of consideration,' said Mr. Weir.

" 'Consideration?' snapped the attorney for the opposition. 'What exactly do you mean? Consideration for what?

" 'Oh, for my wife, my mother, my five sons and my two daughters,' said Mr. Weir."

Doesn't that kind of humor floor you? We looked up Mr. Weir's agency accounts and they include: Federation of Railway Progress; the New York, New Haven & Hartford R. R.; New England Transportation Co. (bus line) but, strangely enough, no aviation companies. We doubt if his chances of getting into aviation are very good, either. He's too funny.

* * *

COPILOT'S DUTIES UP TO DATE—Compliments are coming in on the pome about the copilot's lament, run here Mar. 28, but mostly from the new generation. **Hy Sheridan** says he copied it down first May 1937. "But it is still good in spite of the awful meter, as a matter of history, though unappropriate in modern times. Nowadays, the copilot makes the landing, wakes the captain up, and hands him his shawl."

* * *

C-A-B OR NOT TO BE—It seems pretty difficult to get CAB letter perfect. **Paul B. "Fuzzy" Furlong,** vp and general manager of Metropolitan Aviation Corp., at Teterboro—the area's only helicopter operation—has been trying for a long time to teach his wife aviation terms and abbreviations. But we have it from **George Callahan,** Furlong's chief pilot, that he gave up the other day. The little lady knew how badly the old man wanted the latest news about his pending airline certificate so she telephoned him in high excitement one afternoon and read from the later papers that CAB was on strike. The headline plainly said "CAB DRIVERS TO GO ON STRIKE FRIDAY."

And a few days ago as soon as the Board's executive DC-3 (CAB 424) landed at San Francisco the mystified tower operator called over the airplanes plantitively: "What does CAB mean?" The ship has a loud speaker in the cabin for its passengers and Member **Jones** and the newspaper men aboard roared.

* * *

DIARY—We saw a drive-in movie show from a new angle the other night. Los Angeles Airways pilot **Howard Higgins** was taking us and some bags (mail) on the 134-mile Segment B helicopter route from L. A. Airport to Long Beach and eight other suburbs when we passed over the screen. We'd like to say Higgins lingered around waiting for Donald Duck but he didn't. Schedule's too tight. Just after leaving L. A. the copter suddenly fishtailed a couple of times but Higgins said not to worry. It seems he was just flying over his house and waving to the little wife. We came back to L. A. Airport, on time to the minute, surrounded by 530 pounds of mail.

* * *

KNOCK 'EM OUT BEFORE THEY COME IN—According to the Delta Digest those big, handsome hunks of futuristic transparent glass doors at the new airlines terminal in Chattanooga are really knocking down the customers who can't see them. For the first few weeks there was a casualty a day because the side sections don't open for anybody. One unsuspecting pedestrian knocked himself out before a couple of flower urns were set up. R. H. W.

WHAT'S NEW

New Books

"Postwar Communications Receiver Manual," complete technical analysis of more than 50 of the most popular communications sets on the market; buying guide for purchasers of communications receivers. 264 pages, profusely illustrated, available from Howard W. Sams & Co., Inc., 2924 East Washington St., Indianapolis 7, Ind. Price $3.

Trade Literature

"Aircraft Heating Digest," first issue of a quarterly periodical directed to men who engineer, install, operate and maintain aircraft combustion heating equipment. Copies are available by writing to Aircraft Heating Digest, Janitrol Aircraft-Automotive division, Surface Combustion Corp., 400 Dublin Ave., Columbus 16, Ohio.

"Aircraft Catalog No. 200," a 52-page booklet giving complete engineering and installation data and specifications on flexible hose lines, hose fittings, self-sealing couplings and other products. Available upon request to Aeroquip Corp., Jackson, Mich.

"Catalog G-50," an illustrated 68-page booklet containing full description and complete specifications for standard types of flexible metal hose, in a variety of metals. Also contained: sections on expansion joints for piping systems; stainless steel and brass bellows, and various conduits and special assemblies of these components. Available upon request to Chicago Metal Hose Corp., Maywood, Ill. Specify company affiliation and title.

"General Electric Silicone Oils," a technical report describing physical properties of all nine G-E silicone liquids, as an aid in selection of material for mold release agents, damping media, motor lubricants, manometer liquids, etc. Available upon request to Chemical News Bureau, General Electric, Pittsfield, Mass.

"Wayne Collaps-A-Hose System for Aircraft Refueling," a booklet showing diagrammatically the entire operation of the system, giving engineering data and dimension drawings. Available upon request to The Wayne Pump Co., Fort Wayne 4, Ind.

"Met-L-Prop," a folder describing the McCauley forged aluminum propeller for personal aircraft, containing specifications and comparison table. Available upon request, without obligation, from McCauley Corp., 1840 Howell Ave., Dayton 7, Ohio.

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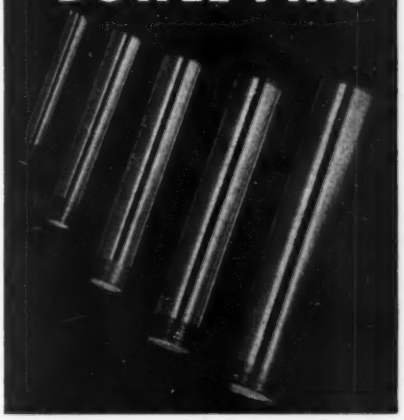

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Inquiring Reporter

(The writer has returned after a week on the West Coast, talking with scores of aviation people as an inquiring reporter. These are reactions).

We flew from Washington to Los Angeles for the FIDO demonstration in the CAB's executive DC-3, with other press men, then to San Francisco for opening of PAA's Stratocruiser service to Hawaii. We returned in the Navy's Constitution with 99 other passengers and 16 crew. Navy believes this is the biggest single-plane load of passengers ever to cross the country. Takeoff was JATO assisted from Moffett Field at 7:40 pm. PST, with Washington arrival at 8:05 am., PST, after a stop of 1 hr., 15 min. at Olathe, Kan.

Ed Slattery, CAB's public information chief, thinks the hard working members of CAB deserve a better break from the press, considering the limitations of staff and money. He forecasts much news from CAB in coming months. He reveals that both Chairman O'Connell and Member Jones took unscheduled inspection trips to study airline operations first hand, shortly after their installation. He says CAB's stringent finances are typified by the Board's only executive plane, outmoded, obsolescent, not even meeting CAB's own fire regulations. It is incredible—he believes—that an agency so vital to aviation cannot afford a modern airliner like the Convair-Liner.

Clarence Belinn, president of the world's largest helicopter service, Los Angeles Airways, is looking years ahead while his Sikorskys plod persistently from airport to post office roof to tiny heliports with their constantly increasing mail loads. These copters with their faithful Wasp Jr. engines, have been running 7 and 8 hours and carrying an average of 7500 lb. every day at a cost of about $10 a mile. Belinn says express can be flown and will be as profitable as mail when REA clarifies its relations with the airlines. The future for passenger service by copter from downtown points, and to airports and suburbs, seems excellent, but it will take time.

Joe Marriott has returned from the boiling cauldron atmosphere of the Commerce Bldg. in Washington to his old Sixth Region CAA office in Santa Monica.

The amazing phenomenon of single engine lightplanes buzzing around carrying mail and passengers under some kind of feeder or Star route system is being discerned dimly in the future by some observers. An aerial Star route bill is already in the House hopper backed by the P. O. Tie this with the deteriorating cost picture of the feeder lines, and P. O.'s sudden cooling off toward further regional helicopter mail services, and you have something to watch.

Lockheed's Bert Holloway says no comment on proposals given Slick Airways for those Model 949 cargo Constellations, with fuselages extended 14 ft. This one is quiescent.

Dave Callahan of Gilfillan Bros. Inc., says they have gone out of the home radio field and are concentrating on GCA production and other more secret electronic work.

A session with Douglas' A. M. Rochlen and forthright Donald W. Douglas, Jr., emphasized the company's overwhelming interest in new cargo planes. They believe they can turn out more cargo ships, and quicker, than any other manufacturer and offer to prove it, whether it's the Super C-47 with triple the C-47's load, or the cargo Six, or the giant C-124 already on order. Young Douglas, who is director of contract requirements and flight tests, calls the C-124 the Liberty ship of a future war.

West Coast scheduled airline people are watching the new, dynamic team of Hughes & Damon like hawks. They expect big doings on TWA's coach service, and a whale of a drive on air cargo. K. C.-Los Angeles coach service is reported above expectations.

California Central and Robin Airways, those two intrastate $10 carriers flying L. A.-S. F. are raising hob with the skeds. California P. U. C. has not indicated that it will take any action against them. Lockheed Air Terminal is swarming with nonsked passengers and companies—California Central, Robin, Viking, Air America, ATC, and the gamut. They outnumber the skeds which had virtually forsaken this field for L. A. Airport until public demand brought some schedules back. We rode Robin to S. F. There were about 20 revenue passengers on the DC-4. Takeoff was on time. Robin leases equipment from California Eastern, which also maintains its ships. Coast talk is that Cal-Eastern, which went bankrupt as a carrier, is making money leasing and maintaining its craft.

That FIDO demonstration was an awesome sight at dusk. But there was a brisk ocean breeze and no fog. Although some jets ignited tardily and sprayed oil vapor about, the bugs should be out soon. Some kind of automatic electric eye installation is being talked about to cut off burners in case a plane ground loops. This pioneering installation cost more than the $800,000 publicized—closer to a million. It should bring big savings to the carriers and the area, however.

There was so much gossip about Western Air Lines we had two talks with President Terrell Drinkwater, certainly one of the smart, new generation of airline executives. His answers came like this: No, he was not disheartened by CAB's proposed investigation of WAL, and does not expect it soon. No, he had absolutely no personal knowledge that Pan American owned any of the ex-Coulter stock. Yes, PAA on Mar. 1 leased hangar, storage, shop, office, ramp and ticket space from Western. Yes, WAL was doing line checks for PAA DC-4s and Stratocruisers. But PAA was only a tenant and he thought they'd pay their rent regularly.

The airlines must consolidate ticket offices, ramp services, and all other facilities. Drinkwater has a standing offer with every other airline serving any of his cities that he will join them in every possible facility. Ticket offices are too expensive. If consolidation will work in Brooklyn and the Pentagon why not elsewhere? It was set up in the Pentagon because the government said that or else. Someday, says Drinkwater, the public will say the same thing as long as hefty mail payments come from Joe Public. Drinkwater thinks the famous Wabash & Monroe corner in Chicago, with its luxurious airline ticket lounges, are a thing of the past, and sooner past the better. Drinkwater claims his revolutionary "no meals" policy, and 5 percent lower fares, is a smash success. One of his competitors wants CAB to force him to announce "no meals served" in every ad and timetable. Drinkwater serves notice that he may retaliate by demanding that any such competitor who does not eliminate meals be forced to advertise exactly which flights feed passengers.

Drinkwater naturally takes a dim view of the nonskeds and feels they should be regulated and controlled. He likes the Convairs, but is having a little pressurization trouble. The six DC-4s are being retired gradually and are for sale. He says they cost him $40,000 a month depreciation, $100,000 a year insurance, $35,000 a year taxes. For a time WAL considered coach fares on the highly competitive Seattle run but decided they would cut the regular business. Inland division is in the black, so there is no hurry to sell it, although Drinkwater concedes it will probably fit into someone else's system when CAB goes farther with its regionalizing.

In 1948 WAL made $134,704, contrasted with a $945,704 loss in 1947. Drinkwater cut payroll from 2396 on Jan. 1, 1947, to 1203 on Mar. 17, 1949, and thinks other lines staving off similar slashes are only fooling themselves. He instituted a new budget control. He praises Stanley Shatto for drastic maintenance savings. He increased man hours by 6000 a month without adding a man. WAL set up its own shops; stopped hiring out maintenance and overhaul.

Drinkwater favors more sensible scheduling by airlines at competing points. Why should every competitor leave simultaneously when the public would benefit from a staggered plan? "We must keep on hammering away on sales, not luxury." The airlines need a better understanding with labor, the WAL chief believes, so labor will play their part in keeping railroad thinking and featherbedding out of our industry. Drinkwater decried the "complete lack of understanding" between CAA-CAB and the airlines. Despite the Act's avowed purpose, to foster and promote sound air transportation, the two agencies, especially their staffs, continually hold the industry suspect. "We have something resembling a badminton game, but nothing is being done. We need less of the policeman attitude on the part of the agencies. To do the investigation job CAB outlined would take four or five years with an adequate staff; with the present staff they'll never accomplish it. Is it significant that CAB came out with its program (1) just before the Hoover Commission report on CAB; (2) just before Sen. Johnson announced the Senate's quiz?"

Drinkwater sees profit for 1949 for WAL. Revenue passenger miles will be up 5 percent over 1948, and passenger revenue should be up about $1 million. We gathered that Frill Hater Drinkwater is making progress.

—ROBERT H. WOOD.

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